

COMPUTERWORLD

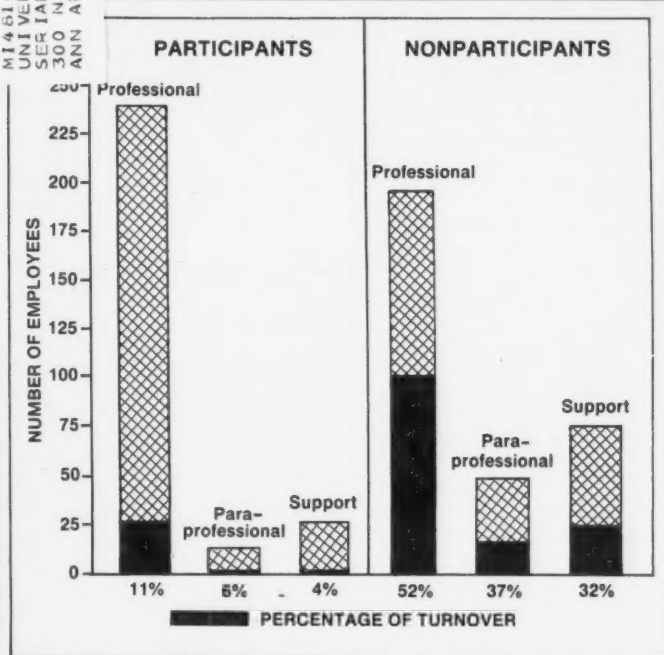
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices © 1979 by CW Communications/Inc.

o. 37

September 10, 1979

\$1.00 a copy; \$25/year



Rate of Turnover According to Training

Training Programs Credited For Slower Turnover Rate

By Don Leavitt

CW Staff

MADISON, Wis. — Lower turnover rather than higher productivity may be the principal benefit of a good DP training program.

A study of a 600-employee software development organization showed a 10% turnover rate for employees participating in training and development activities. That compares with a 45% turnover rate for those employees not participating, J. Thomas Horrigan, a consultant with Booz, Allen & Hamilton, Inc., reported in a recent issue of *The Training and Development Journal*.

Horrigan also calculated that 92% of the dollars spent for training and development was retained in that particular company, while only 8% was lost through the departure of participants.

Working with those measured results and his observations of the DP community in general, the consultant also offered a cost-justification model for additional training budgets.

The premise of the model? Because the turnover rate of participants in training is demonstrably lower than that of nonparticipants, an increase in the number of participants should result in a drop in terminations and a substantial — though indirect — dollar savings for the company.

Justifying the cost of training by reducing turnover through increased participation in training is admittedly an untested idea, he said. Yet in the case study, the model yields an indirect

cost savings of \$77,000 to \$161,000 if participation can be boosted 10%. Those figures "argue strongly for serious consideration of the model's use."

Conventional methods of determining the effectiveness of training involve both pre- and post-training test-

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Network Handles Voice, Data, Fax

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — A microprocessor-controlled communications network that handles voice and data signals simultaneously while reducing the bandwidth and transmission time

required for each was described at the Comcon '79 conference here last week.

Key to the network's efficiency is a synchronous network processor (SNP), a PBX-like unit that allows selection and routing of voice, facsimile

and digital data under automatic or operator control, according to the network's developers, Fred Sammartino, F.R. Corrado and C.R. Davis of Time and Space Processing, Inc. in Cupertino, Calif.

SNP, located at each node of a point-to-point or multipoint network, consists of a set of distributed microprocessors, a separate one for each type of communications. Signals output by each terminal device (vocoder, facsimile machine or computer, for example) are converted by the microprocessor into an internal compressed format and transmitted through the network to the destination, where another SNP microprocessor reconstructs the data into its original form.

"Significant bandwidth reduction is possible since each microprocessor can be programmed to recognize and extract overhead, redundant and extraneous bits peculiar to the type of data being processed," the network's developers explained. "This is espe-

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David Meets DP Goliaths

By Tim Scannell

CW Staff

SUITLAND, Md. — As hurricane David raked across Florida's east coast last week and then slammed into Georgia and the Carolinas, forecasters here at the National Meteorological Center (NMC) watched as computers tried to pinpoint where the killer storm would strike next.

Located just outside Washington, D.C., the National Weather Service's NMC uses three large-scale IBM 360/195 mainframes to

track weather patterns and create computer models of potentially dangerous storms like hurricane David. Using the machines, forecasters "work out" equations that describe the current and projected future states of the atmosphere surrounding storm centers around the world.

The results of these equations are fairly accurate weather predictions of a storm's travels from 12 hours to sometimes up to a week in advance of its arrival, according to Mark

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IBM Changes Policy In Attempt to Win Government Contracts

By Marcy Rosenberg

CW Staff

IBM has guaranteed 95% equipment uptime to at least two state government agencies, a departure from the firm's standard General Services Administration (GSA) contract which guarantees 90% equipment availability.

IBM made this and other modifications to its standard form agreement for state and local governments when it agreed to four provisions of a Florida state agency's request for proposals (RFP) for a multimillion-dollar DP system contract.

The provisions, as described in a recent "Computer Negotiations Report" (CNR) newsletter, relate to the state's definition of equipment failure and to its terms calling for liquidated damages for delayed delivery, acceptance testing and credit for equipment malfunction.

In its RFP, the Florida Department of Highway Safety and Motor Vehicles (DHSMV) attempted to include software as well as hardware malfunctions in its definition of equipment failure. While only a hardware malfunction would constitute equipment failure in IBM's standard form agreement, the firm accepted DHSMV's equipment software combination, but only for operating system software, not for licensed programs.

The Florida agency also proposed

that it receive liquidated damages from IBM for late delivery not only of equipment, but also of programming aids. Again, even though IBM's standard agreement specifies payment of liquidated damages for hardware delivery delays only, the company agreed to pay liquidated damages if either equipment, systems programming or licensed programming could not be delivered by the state's specified date.

Free Maintenance

Similarly, IBM deviated from its standard contract when it agreed to certain of DHSMV's provisions for acceptance testing of equipment. Besides agreeing to the 95% effectiveness level, the firm also agreed to provide maintenance services during all acceptance testing at no cost to the agency.

And while IBM generally will not grant credits to customers for other than hardware failures, it agreed to do so also for system control program malfunctions, as requested by the DHSMV.

According to CNR, these concessions by IBM to a state government agency show that IBM's standard contract — is not as ironclad as many users are led to believe.

Indeed, Frederick M. Specht, an employee in the Contract Relations De-

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In Joint Venture With MCA IBM to Develop, Sell Video Disks

By Marcia Blumenthal

CW Staff

ARMONK, N.Y. — IBM and MCA, Inc. have formed a joint venture to develop, manufacture and market video disks and video disk players.

Known as Discovision Associates, the venture will be owned and controlled jointly by IBM and MCA. MCA will retain a larger share of the earnings initially, although ultimately the two companies will share them equally.

IBM has contributed its patents technology and an undisclosed amount of cash to the joint venture, and MCA has provided the assets of its current video disk business, including its patents and technology. IBM would not comment on whether the technology developed by the joint venture would be used for DP applications.

Although IBM holds patents on video disk technology and has been developing that technology for several years, the firm does not currently have any products that address the video disk market, a spokesman said.

Th initial thrust of Discovision will be to sell "audiovisual products for use by the industrial marketplace," the IBM spokesman said. As an example, MCA cited a recent sale of 7,000 video disk players to Genral Motors Corp. The disk players will be used by the auto maker's dealerships.

'Blending of Skills'

Commenting on the association, IBM Chairman Frank T. Cary and MCA Chairman Lew R. Wasserman said, "This move will make possible a blending of complementary skills and expertise. We believe it will provide the opportunity to broaden the use of video disk technology in the home entertainment and the industrial educa-

tion and information fields."

Despite Cary's allusion to broadening the application of video disk to the information field, the IBM spokesman would not comment on whether the products developed by the venture would be suitable for use in conjunction with IBM's traditional DP products.

When asked whether IBM is developing video disk technology for use in mass storage devices or whether technology related to such an application would be transferred to the joint venture, the spokesman again refused to comment.

It was disclosed recently that North American Philips' Magnavox Government and Industrial Electronics Co. (Magiec), in conjunction with Philips Laboratories, had developed a prototype optical disk recorder [CW, July 23]. That recorder reportedly stores 2 by 10¹⁰ bits of information on a dual-sided disk for use by DP installations.

Magiec is said to be conferring with a number of business partners about developing mainframe and peripheral interfaces for the product as well as setting up a marketing organization.

Overseeing Policy

An Associates Committee will oversee broad policy matters involving the IBM-MCA joint venture. IBM has appointed George B. Beitzel, senior vice-president and group executive, as its representative. MCA President Sid Sheinberg is the other representative.

Beitzel is a high-ranking IBM executive in charge of five groups including the General Systems Division, the Office Products Division and the General Technology Division, which developed the 64K-bit chip.

MCA, with revenues of \$1.1 billion last year, was founded 25 years ago. Its

principal line of business is motion picture and television film production.

The firm started its Discovision operation in the early 1970s, but started marketing video disks to consumers only last Christmas. The only other real contender for this market is Magnavox, a subsidiary of North American Philips, MCA spokesman said.

MCA will retain its copyrights and other rights pertaining to the distribution of consumer video disks. Discovision will manufacture those disks and sell them back to the MCA Discovision consumer operation, the MCA spokesman added.

Electronic Mail: No Hard Copies

WASHINGTON, D.C. — In response to an inquiry from the Postal Rate Commission, the chief of the Federal Communications Commission's (FCC) Common Carrier Bureau determined recently that FCC rules do not require common carriers to retain records of computer-originated mail.

The Postal Rate Commission asked for clarification of a clause in the FCC rules that addresses retention of telegram messages. "Although we have never precisely defined the term 'telegram,' we have determined that it is a subset of the broader category 'public message service,'" the Common Carrier Bureau found.

"Public message service does not include computer-originated mail [and] since telegrams are a subset of public message service, the clear implication is that telegrams cannot include computer-originated mail," the bureau concluded.

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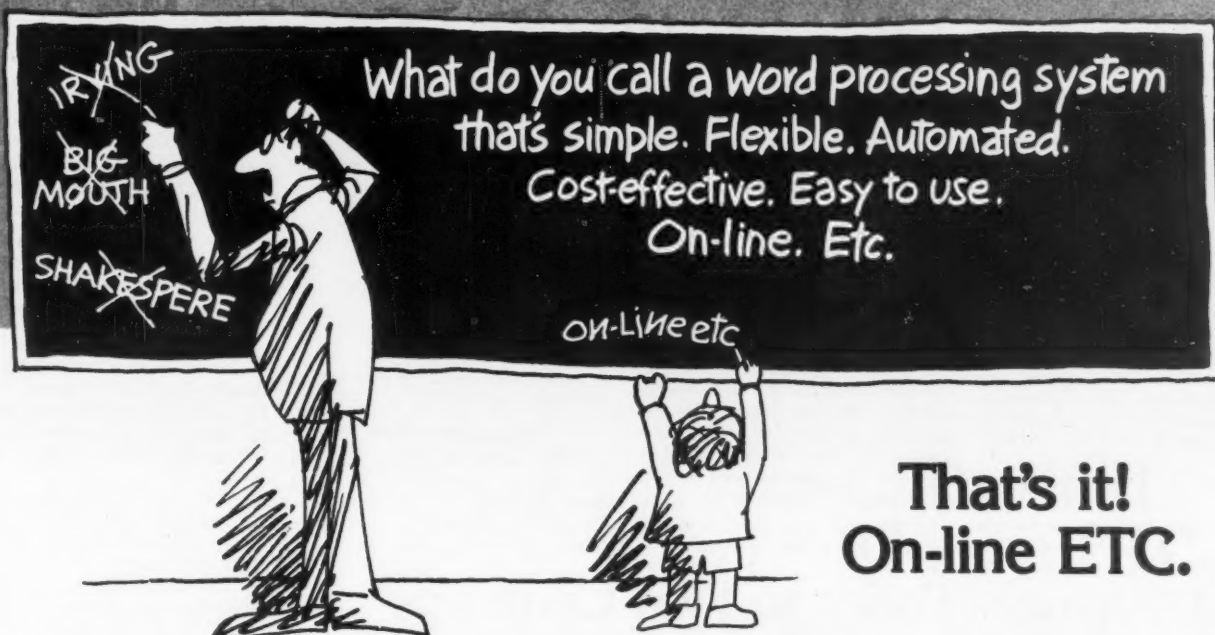
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On-line ETC vs. the "competition."

Individual turnkey systems often rely on minicomputers. This limits the features they provide and tends to fragment a centralized DP operation. Photocomposition systems, also minicomputer-based, require extensive training and sophisticated hardware. Other IBM-based systems avoid these disadvantages but often they're so complicated, only DP professionals can use them.

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Document Reveals IBM Contract Strategy

By a CW Staff Writer

A confidential IBM document that surfaced during a hearing involving the State of Florida and IBM (see story on Page 1) offers some insight into the strategy the firm used to win a contract from the Florida Department of Highway Safety and Motor Vehicles.

Excerpts from these IBM marketing strategy notes were provided by International Computer Negotiations, Inc. and will appear in detail in Vol. III, Issue 5 of its "Computer Negotiations Report" (CNR). Portions of this document suggest how IBM, and perhaps other vendors, plan their contract negotiating tactics.

Under a headline, "Strategy Elements," the following items were included:

- "User driven RFP [request for proposals] and evaluation."

- "Cautions: Amdahl and Univac." These firms were potential competitive bidders.

- "IBM support and flexibility story."

- "Other mfg. is high risk (IBM essential to success)."

- "Get Series 1 selected for Tax Collectors."

The last item demonstrates how a vendor will attempt to utilize other user equipment selections, often in different user departments, to influence the primary evaluation and selection process, CNR pointed out. IBM apparently recognized that it could gain negotiating strength by having motor vehicle tax collectors use IBM Series/1 equipment, CNR proposed.

Another tactic used by vendors is to avoid or work around its weak points.

An indication of IBM's perceived weaknesses can be gleaned from several listings under a heading, "What We Don't Want in RFP." These include:

- "Equipment we can't deliver."
- "Demonstrate S/1 interface (or programming thereof)."
- "Sole emphasis on price."

According to CNR's interpretation, IBM apparently believed price could be one of its weak points and also appeared concerned about being forced to demonstrate certain equipment replacements and interfaces.

Ending Competition

A third vendor strategy is to try to convince a potential user to reject equipment offered by another potential supplier. CNR pointed to evidence of this "ploy" in several items listed

under "IBM's Outline for HSMV [Highway Safety and Motor Vehicles] Executive Call." Among them:

- "An IBM System/370 has low risk of failure." IBM had bid a 370/158, interim to a 3033.

- "RFP terms and conditions, vendor guarantees, and claims of capability don't equal success." And, as a sub-item to above, "Payments by vendors when they fail cannot produce titles, licenses, or registrations." HSMV sought to replace an existing Burroughs Corp. B6700 system with a new DP system to issue and maintain records of drivers' licenses and motor vehicle title certificates and registrations.

- "IBM understands HSMV's situation and crisis and want you to know we are prepared to make our systems approach a success."

In this example, IBM apparently tried to emphasize the reliability of its own system and raise doubts as to whether competing vendors could "deliver" or actually perform, CNR suggested.

CNR is published monthly by International Computer Negotiations, 1331 Palmetto Ave., Winter Park, Fla. 32789. U.S. subscriptions cost \$195

IBM Changes Policy to Win Contracts

(Continued from Page 1)

partment of IBM's Data Processing Division, admitted that the four provisions in the Florida RFP did not represent the terms and conditions of IBM's standard forms for state and local government contracts. Specht testified to that effect at an administrative hearing in which IBM and two other bidders, Amdahl Corp. and ITEL Corp., challenged the state's rejection of certain changes to its RFP that were submitted by the companies.

In sworn deposition testimony, Specht admitted DHSMV's provisions for 95% ongoing availability, acceptance testing, liquidated damages and downtime credits were special conditions that usually had to be bargained for with IBM.

He also acknowledged that IBM had not previously offered credits for equipment malfunction — as requested in the RFP — and that IBM was concerned about the precedent it set when approving this condition.

A spokesman for IBM, however, said the concessions made by the firm in the four areas were "not unprecedented," citing as an example Specht's testimony that IBM had bid 95% equipment availability once before on a contract involving the Arizona De-

partment of Public Safety.

"Individual states often ask for specific terms and conditions based on their local laws or statutory regulations," the spokesman said, and IBM, "as all vendors would, does it best to

respond to those terms."

The state of Florida eventually rejected all competitive bids on the DHSMV contract and its right to do so was upheld at the hearing. The contract has been put out for rebidding.

Training Found Way to Cut Turnover

(Continued from Page 1)

ing and pre- and post-training observations by the employee's supervisor. These methods have flaws, Horrigan noted. They provide information on whether a person's behavior has changed, but are expensive in terms of the time required of the trainer, participant and the participant's supervisor.

The classic measures may also be impractical if standardized tests are not available or if the supervisor's observations are not reliable or valid, he pointed out.

Although analysis of trainee vs. non-trainee turnover does not provide direct information on behavioral or attitudinal changes sought by training, such a study may be an acceptable substitute. It may, indeed, provide a measure of whether employees believe the company cares about them, and

awareness of that is vital to a company.

"If an employee is not around to put into practice what he or she has learned, the time and financial investment has been wasted from the company's standpoint," Horrigan warned.

Turnover rates of participants and nonparticipants can only be usefully compared, however, if adequate records are kept by both the training group and the personnel unit that reports on the departure of employees. Even in the case study, Horrigan noted, he had to work with incomplete turnover records kept by personnel and only "somewhat better" participation records kept by the training and development section.

The study itself was undertaken in a software firm that employs about 425 programmers, analysts and data technicians and about 175 management and support personnel. The major comparisons were made on employee terminations and training programs occurring in calendar year 1977.

Statistics provided by Horrigan subdivided the employees into professional, paraprofessional and nonbillable support personnel. Turnover in this study included just those employees who left the company; employees hired as replacements were excluded.

Other Factors

While he was confident the contrast in turnover rates "lead to the conclusion that training can have a significant effect" on turnover, Horrigan cautioned that other factors may come into play as well.

It may be, he said, that those who participated in training are more interested in careers than in simply holding down jobs. Conversely, those who did not participate may have been interested in short-term gains from their jobs and not careers, or perhaps were not motivated to develop themselves

or their jobs.

Factors beyond the employees may be part of the picture. The nonparticipants "may have applied for training, been turned down and ultimately become frustrated and left. Finally, those who did participate but left may have been frustrated by lack of progress internally and therefore sought it outside.

"Training can be a two-edged sword," Horrigan continued. "If a company provides the opportunity for employees to learn, it must also provide them with the opportunity to use what they have learned to progress."

How Model Works

Explaining how his cost-justification model works, Horrigan said if a company boosts the level of participation of its employees in training — and then, presumably, follows through with appropriate career opportunities — the money saved from reduced turnover will more than offset the extra training expenses.

In the case study, for example, if the participation rate jumps from 47% to 57%, 60 additional employees would be involved. As participants, their turnover rate (10%) would lead to the loss of one employee. If they do not participate, their turnover rate would lead to 27 terminations.

The 21 employees "saved" by the additional training would, in effect, mean an annual savings of \$77,160 to \$166,160, although the savings "would not be expected to occur toward the higher end of the range" because some of the turnover occurs in the generally lower paid support personnel.

Horrigan's article appeared in the July 1979 issue of *The Training and Development Journal*. Copies are available for \$1 from the American Society for Training and Development, P.O. Box 5307, Madison, Wis. 53705.





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Because of Excessive Downtime SSA Pulling Plug on CMI 370/168 Memory

By Maguerite Zientara

CW Staff

WASHINGTON, D.C. — The Social Security Administration (SSA) has scrapped 7M bytes of Cambridge Memories, Inc. (CMI) memory because of problems that resulted in 166 hours of computer downtime between August 1978 and February 1979.

To replace the CMI equipment — consisting of one 3M-byte and one 4M-byte unit — one 7M-byte "box" of National Semiconductor Corp. memory leased to the government by Federal Data Corp. of Chevy Chase, Md., is scheduled for installation on Sept. 17.

The CMI contract was "terminated for the convenience of the government and [the termination] was mutually agreeable to both Cambridge Memories and SA," both parties said.

The "power supply, cable and other failures" of the CMI equipment disrupted SSA's use of its IBM 370/168 program test machine during the six-month period, according to Dr. Jan Prokop, acting associate commissioner for systems.

Before the contract was terminated, one spokesman for the firm denied that its memory was at the root of any

problems. Last week, however, a different spokesman conceded its memory may have been at least partly to blame.

"We have a large number of 370/168 memories working, [but] I'm not saying there were no problems with this equipment," he said. The connection of memory to a CPU is a "reasonably complex attachment . . . sometimes it's difficult to determine where the problem lies."

And from another CMI spokesman: "The SSA has a very, very large data processing room and it has a lot of problems there with air conditioning and everything else."

The CMI equipment is still installed

and has continued to cause problems all summer, Prokop said.

The SSA originally installed the CMI memory because the firm had been awarded the General Services Administration (GSA) mandatory requirement contract as the lowest national bidder. There were problems "from the beginning," Prokop claimed, because "some of the pieces were not installed properly."

CMI was consistently cooperative in trying to fix the problem, another SSA spokesman noted, but continuing malfunctions forced the agency to seek another memory supplier. It's a small company and it doesn't have field service people all over the place," Fred

Schutzman, associate commissioner in the Office of Assessment, noted. "It flew someone down here for four or five days, along with spare parts," but otherwise the SSA has "had trouble getting the spares."

After the installation of the 3M bytes in August 1978, the 370 failed three times that month, for a total of 18 hours downtime, Prokop said. Subsequently, the machine went down eight times in September, 14 times in October, three times in November and twice in January, for a total of 166 hours downtime from August to February.

The system was down for a total of 11 hours in March, 36 hours in April and 76 hours in May, Prokop said.

System Pleases First 7031 User

By Jay Woodruff

CW Staff

FORT WORTH, Texas — Having taken delivery of the first available ITEL Corp. AS/5 Model 5 nearly nine months ago, this city's DP director said last week, "I think we made a good decision."

According to Charles W. Cox, the mainframe, also known as the 7031, appears to be IBM-compatible as claimed and he is continuing to get unusually good support service from ITEL.

Fort Worth acquired the system for its police and court system when it outgrew a pair of IBM 370/148s. Response time on the overworked systems, at more than five seconds, had become unacceptable. The replacement system reduced response time to two seconds [CW, May 14].

The DP director is pleased with the "very reliable" overall performance of the system; he cited only occasional difficulties. "Some of the little glitches include a problem or two with console malfunctions, and occasionally we get an indication of supervisory damage, which has shut the machine down," Cox explained.

ITEL "tends to overlook any jurisdictional boundaries that some other vendors uphold very strongly," Cox said. "In other words, if there is a problem with someone else's equipment, it doesn't hesitate to pitch in to determine the exact cause of the problem."

The DP director admitted that IBM's announcement of the 4300 series made DP planners here worry whether "they had done the right thing" in ordering the 7031. However, "the availability of those 4300 series machines is such that, should we choose to go to one later, we'll have the ITEL paid for by then, so we'll feel like we got our money's worth."

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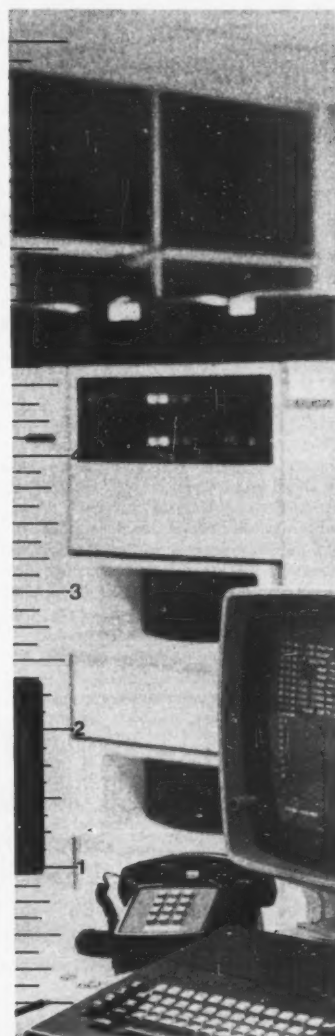
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IEEE Presents 1979 Piore Award to Hamming

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — "The characteristic of a great scientist is that he picks up what appears to be a rock, turns it over and finds it's a jewel."

It is that urge to look beyond the obvious that produces greatness in scientific research, Dr. Richard W. Hamming said upon receiving the 1979 Piore Award from the Institute of Electrical and Electronics Engineers (IEEE) last week.

The award, presented during the IEEE Computer Society's Compcon '79 conference here, cited Hamming for "outstanding achievement in the field of information processing" and for his contributions "to the advancement of science and the betterment of society." The award was presented during the first day of the conference, the theme of which was "Using Microprocessors — Extending Our Reach."

The Sept. 5 award ceremony, which opened the two-day conference, was directed by Compcon Conference Chairman Dr. Portia Isaacson of Electronic Data Systems Corp. Isaacson, noting the rapid development of microprocessor technology, predicted that in the near future "the astonishing computer power" of micros will lead to a large proliferation of computer systems in both home and office use.

Although microprocessor technology has advanced at amazing speed over the last few years, "the real revolution — when we can create products we never thought of before — is just starting," she said.

The Piore award, established by IBM in 1976, was presented to Hamming by C. Lester Hogan of Fairchild Instrument and Camera Corp. Hogan is IEEE vice-president for technical activities.

Hamming, who retired from the Bell Telephone Laboratories in 1976 after 30 years of service, is known for his work in developing high-level computer languages and for the "Hamming codes," error detecting and correcting codes still in widespread use.



CW Photo by J. Kirchner

Richard W. Hamming (standing, left) accepts the 1979 Piore Award from IEEE Vice-President C. Lester Hogan as conference keynoter Dr. William H. Davidow and Dr. Portia Isaacson look on.

Crediting much of success to his co-workers and predecessors, Hamming quoted Isaac Newton: "If I have seen farther than others, it is because I have stood on the shoulders of giants."

Hamming, who said his career was

devoted to decreasing the distance between himself and those he perceived as "great" scientists, said there are many capable of outstanding work who do not take the extra effort needed to achieve greatness.

He encouraged his audience to de-emphasize the quantity of numbers produced by computers and concentrate on producing "important numbers." Hamming urged his fellow engineers not to "do the obvious."

Network Transmits Voice, Data and Fax

(Continued from Page 1)

cially effective for voice and fax transmissions because even though these transmissions require a full-duplex channel, they are both inherently half-duplex processes.

"The actual usage of a voice link is only about 40%. We take advantage of this characteristic . . . to multiplex six voice conversations into [a] 9,600 bi/sec [channel] with no degradation in speech quality."

The system also reduces the number of channels needed for nonvoice trans-

missions. Separate transmission paths are normally needed in conventional networks because some signals — facsimile, for example — are tolerant to transmission errors while others, such as computer data, are not.

There are numerous other differences, the authors pointed out at the conference, sponsored by the Institute of Electrical and Electronics Engineers. Fax and computer data are tolerant to transmission delays, but real-time instrument data is not. Computer data usually can be received in an order different from the one in which it was sent, but the characters and words comprising facsimile messages must be received in their original order.

The SNP, by configuring a single channel to accommodate the peculiarities of each type of transmission, allows all of them to be carried by a single communications link.

A control terminal with a graphics display is connected to each SNP. Through it, an operator can automatically reconfigure a circuit at specified times.

A circuit connecting terminals in the U.S. and Europe, for example, can be used for voice and facsimile transmission during the time when working hours overlap, for fax and computer data when only one of the offices is open and for computer data alone when both offices are closed.

Business Expo Set Oct. 30

HOUSTON — Business executives looking for the latest information on word processing, small business systems, records management and more should be able to find it at Southwest '79, the Computerized Office Equipment Exposition.

The three-day conference will showcase the latest applications of computerized business equipment including computers, word processors, copiers and duplicators and telephone systems when it opens Oct. 30 here at the Astrotall.

In addition to the exhibits, the exposition will offer in-depth coverage of computerized technologies through a series of seminars given by authorities in the field.

Organizers said the title of the exposition, formerly the Southwest Business and Equipment Exposition, was changed to the Computerized Office Equipment Exposition to reflect the transformation of business operations by electronic technology.

More information on the show is available from Industrial and Scientific Conference Management, Inc., 222 W. Adams St., Chicago, Ill. 60606.

Scholarship Offered To College Students

INDIANAPOLIS — College sophomores and juniors enrolled in computer science or computer technology programs are eligible to compete for a scholarship by a publisher here.

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Development Outstripping Applications Micros Seen Moving Too Quickly

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The rapid development of microprocessor technology is far outstripping the ability of the industry and of end users to apply that technology, Dr. William H. Davidow of Intel Corp. warned here last week.

Delivering the keynote address at the Compcon '79 conference sponsored by the IEEE Computer Society, Davidow issued a sobering message to several hundred computer scientists and engineers gathered to discuss "Using Microprocessors — Extending Our Reach."

Facing "the risk of being called the conservationist of the microprocessor industry," Davidow said it is no longer evident that maintaining the present rate of microprocessor development is optimal or that users will be able to take advantage of the coming developments in microprocessors.

Discussing the limitations of applying microprocessor technology, Davidow, vice-president and general manager of Intel's Microcomputer Systems Division, said the "vast majority" of end-user applications do not require the throughput of advanced microprocessors.

The technology is advancing so rapidly, he said, that the problems of applying current technology are not being adequately addressed. Current technology, at today's cost and sophistication, is adequate for most future applications, according to the Intel executive.

Furthermore, Davidow said, "the next generation of microprocessors is being brought to you at considerable expense." He estimated the next generation of micros will cost hundreds of millions — if not billions — of dollars to develop.

He compared the willingness to spend vast sums of money for "revolutionary" hardware to IBM's decision some years past to scrap its plans for "Future Systems" hardware. After much user input, he recalled, IBM decided to "bring its customers along" on an evolutionary — not revolutionary — path because users could not afford to junk existing systems for totally different designs.

Davidow apologized for striking a conservative note at an engineering conference, but said, "If I am right — and I am right," engineers should worry less about developing new technologies and concentrate on learning to apply existing ones. They must stop concentrating on hardware and start solving problems, he stated.

Limiting Factors

It is not cost or lack of computing speed that is limiting microprocessor applications, Davidow continued. Rather, "the vast majority of applications" are limited by inadequacies in four areas:

• **Design productivity.** "There is a real dearth of application-oriented programming languages," he said. "Driven by the intensity of competition, the industry has jumped ahead to new microprocessor generations before the work is completed on present ones. The lack of peripherals and operating systems for current micro-

based systems is evidence of this.

• **End-user application costs.** The expense of applying the relatively inexpensive microcomputer systems is so great that the money saved in their use

CW at Compcon

does not compensate for implementation costs.

The talk of home computers and of thousands of businesses using microcomputers "is just plain talk," Davidow said. Instead of looking forward to the promised land of universal com-

puter usage, the industry should concentrate on making existing systems more usable. What users need are systems that are indestructible, idiot-proof, highly mobile and easy to use.

• **The number of trained technicians.** "There is a severe shortage of technical personnel," he said.

One of the impacts of large-scale integration has been to reduce the number of engineers needed to implement new systems. "Today, you can plug together a few digital modules and program them." Instead of engineers who specialize in certain system components, the industry now needs engineers with broad hardware, software

(Continued on Page 8)



CW Photo by J. Kirchner

Dr. William H. Davidow

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David Wreaks Little Damage on Florida Sites

By Tim Scannell
CW Staff

With winds gusting up to 100 miles per hour, uprooting trees and knocking down power lines, hurricane David could have disabled scores of DP centers scattered along Florida's eastern coast — but most sites were prepared and weathered the storm.

A random survey of DP centers along

the windswept seaboard revealed that nearly every one survived the hurricane with little or no damage. The damage that did occur at some sites was minor and, for the most part, not directly attributable to the storm.

The machines at Florida International University's (FIU) Computer Services Center, an academic DP site in Miami, were turned off to avoid any power

problems the system might experience because of David. However, when power was returned, the center's air conditioning system malfunctioned and incapacitated FIU's Harris Corp. Slash 6 processor for a few days.

A disk drive at the center was also damaged when the unit was powered up because an oil-pumping breaker switch had not been reset, Dennis Plaska, FIU's operations manager, said.

"We have a Harris disk and when you hit the power-off button, it doesn't cut power to the whole disk unit, just the spindle itself," Plaska explained. Workers at the center turned off a breaker switch in the back of the disk unit, which normally isn't touched, to cut all the power, and when we powered it back on... it gave off an odor like something was burning."

Plaska pointed out that powering down the whole DP center is standard procedure in the event of a storm like David. "Anytime we know that power's going to go off, we power down the equipment. I don't like breakers to blow because you never know whether you're going to get a surge" through the power line, the DP

manager explained.

Meanwhile, upstairs at the Southeast Regional Data Center (Serdac), Operations manager Jay Samuelson had a few problems restoring another computer system after the power returned. Serdac had a Univac 1100/81 mainframe that supports two other college campuses as well as FIU's Computer Services Center.

The data center is also linked to an Amdahl Corp. 470V/5 in Tallahassee which provides backup and additional computing power.

According to Samuelson, the problems were caused by a burnt-out board that was easily replaced.

Finally, in West Palm Beach, one of the area's hit hardest by the storm, the Palm Beach County's municipal computer system was down for about a half-hour because of memory problems. Located in the courthouse, the Univac 90/60 was switched off in preparation for David, and operators couldn't get the memory to function once the power was turned back on.

DP Director J. Barry Clark noted that the system's difficulties were not necessarily "directly related to the storm."

Progress of Killer Storm Predicted by DP Goliaths

(Continued from Page 1)

Zimmer, a meteorologist and director of computer operations at the National Hurricane Center in Miami, Fla.

The NMC computers "will give us a description and also generate a picture of the general atmospheric flow pattern," Zimmer explained. "We take these observations and run an analysis program on them and generate data on an evenly spaced grids to give us an analysis of the current conditions. Then, on these computers, we run models that generate a forecast for [a particular] area."

The NMC processors analyze a storm, considering such variables as temperature, dew point, wind direction and velocity, ground surface pressure and the height of pressure levels throughout the atmosphere. While the National Weather Service can never be 100% accurate in its storm predictions, it can tell approximately where a weather pattern will flow within 50 to 100 miles up to 24 hours in advance, Zimmer noted.

Reporting Network

Although the National Hurricane Center is thousands of miles from the NMC, they use terminals to swap data that is eventually input to the 360/195s. In fact, weather reporting stations are irregularly scattered all over the world, 50 to 100 miles apart,

and each one contributes vital data to construct a final atmospheric picture, Zimmer said.

To facilitate this information exchange and analysis, nearly 1,400 communications lines snake into the Maryland center, where several IBM 360/40 systems preprocess the data before it is input to the larger machines.

To add to this weather-forecasting network, a number of research satellites, including the Miami hurricane center, perform their own — sometimes more detailed — weather analysis on a smaller scale.

"In other words, the national center does it on a national and in fact on a global scale, and then we do an analysis here using that as a guide," Zimmer explained.

The National Weather Service has also installed small 4K- and 8K-byte minicomputers in a number of instrument-packed aircraft that fly through a hurricane into its center, or "eye," collecting data all the way. Although weather statistics are recorded continuously by a number of devices within the plane, the on-board computers collect and format certain informational bits which are then bounced off a satellite and picked up by ground stations. The signals are relayed back to the NMC and the 360/195s.

Micro Developments Seen Outstripping Applications

(Continued from Page 6)

and end-use applications knowledge.

• **System integrity.** Even with present technology, Davidow said, "I do not believe we know how to build a complex digital system so that it can be testable." As the complexity of microprocessors increases, it becomes more and more impossible to test systems for all intended uses.

An even more alarming problem in the area of system integrity, he said, is that as more and more intelligence is built into the hardware, the systems will evolve from analytical tools to

control mechanisms.

As a result, microprocessors will become more and more involved in areas now the province of human judgment. A programming error in this kind of system could, if put into widespread use, result in "large classes of people... consistently affected in a catastrophic way."

"Are we making progress too fast?" Davidow asked. He pointed to the "exponential increase" in microprocessor development over the last 15 years. The ability to implement the results of this development is advancing at a much slower rate, he said.

The progress of the ability to apply the new products will not rapidly increase in the foreseeable future, he added.

"Most of us are engineers who like to do new things," he noted, but said users are not calling for revolutionary microprocessor development. According to Davidow, the industry should be concentrating on the "more mundane issues of design productivity, applicability and system integrity."

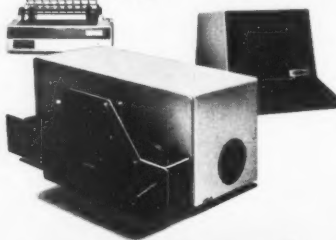
He concluded by urging the microprocessor industry to "attack the mundane with a higher degree of enthusiasm."

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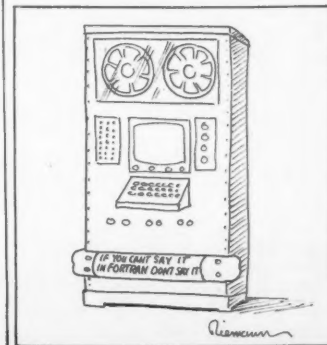
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College Enrollment Figures Inflated DP Problems Cost Virginia Taxpayers \$400,000

By Marguerite Zientara
CW Staff

RICHMOND, Va. — An operating system conversion and inefficient programming contributed to the inflation of student enrollment figures in the Virginia Community College System (VCCS) last year, costing taxpayers \$400,000 in unneeded state payments to the schools.

Undertaken in response to media charges of enrollment "padding" and inaccuracies, an audit found that enrollments in the 23-college system were inflated by about 500 students, according to Gordon K. Davies, director of the Virginia Council of Higher Education. That is about 1% of the system's total enrollment of 55,000.

Enrollment figures are crucial in determining how much state money the colleges receive; each student is currently worth about \$750 to \$800 in state funds.

The audit report emphasized that the council found no evidence of deliberate enrollment padding at any of the schools, but rather "considerable confusion... variation in practice and deviation in policy" of enrollment polling in the state's sprawling community college system.

Some schools counted students twice and wrongly included students who had withdrawn from classes, those who were not receiving academic credit for taking courses and senior citizens who received free tuition at the schools. "At almost every community college," the report stated, "problems with the... Consolidated Computing Center and the Student Information Package [SIP] were discussed as a possible reason or source of the enrollment reporting errors identified by the review teams," the audit report said.

Consolidated Processing

Many of the computing problems associated with the inaccurate count stemmed from the fact that all the DP activity for the 23 community colleges — including payroll and other administrative tasks — takes place at the Virginia Commonwealth University (VCU)/VCCS Consolidated Computer Center here. While there are "very few" problems with the VCU portion of the center, according to Terry Crum, director of the center, red tape and a circuitous method of troubleshooting for the 23 other schools have caused delays and other problems in the past.

In addition, each of the 23 schools has its own computer director with responsibility for applications development, administrative systems and academic systems as well as for his own modems, remote terminals and communications lines. The computer directors' responsibilities do not, however, extend to the central system itself, which is the responsibility of Crum and his staff.

In addition, the schools "keep tight control over their own [IBM IMS] data base management system and do not allow us to get involved until it's disaster time," Crum said.

The center uses an IBM 370/158 Attached Processor configuration with 5M bytes of memory and a 370/148 with 2M bytes of memory. Connected to the system are 90 IMS data base management terminals, 50 remote job

entry terminals and 25 time-sharing terminals located throughout the state.

Schools with problems related to the accessibility of the center and data base usually cited equipment failure or telecommunications problems, the report said. At several institutions the problems were mechanical; one institution had terminal equipment problems for four weeks at the beginning of the 1978 fall quarter.

Slow Responses

Although all the colleges have interactive terminal access to the student data base, many indicated that the response time is so slow and the display capabilities so limited that they usually

rely on manual files."

Such problems were largely a result of the center's conversion from the SVS operation system to MVS during the audit period, according to Crum.

The center made the conversion primarily to resolve its system availability problems. "The SVS system had been highly modified by local programmers to the extent that it was not very stable," Crum said. "It failed a large number of times."

The conversion was made in August 1978, just before the audit began. The month of September was a "settling down" period after the conversion.

The report also cited "design capabilities of the VCCS Management Infor-

mation System and... institutional personnel's [lack of] knowledge and ability to use those capabilities" as part of the problem.

Service OK Now

While the report also concluded that the level of service provided by the Consolidated Computing Center was "inadequate to permit the colleges to report their enrollments accurately," Crum maintained that conclusion is out-of-date.

"Since January 1979, the availability and reliability of the computer center here has been outstanding," he said. "We've been running at about 99% availability."

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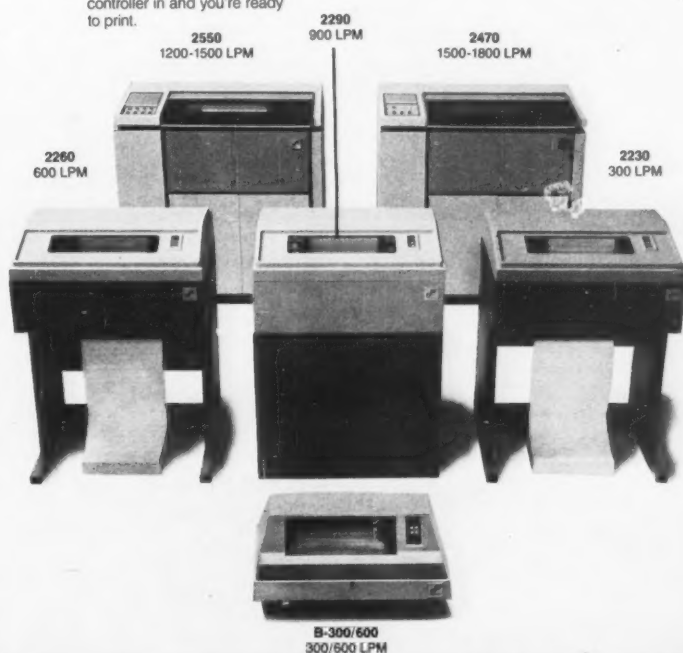
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State Legislation Best Privacy Protection: NBS

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Employee privacy rights should be protected through state legislative actions, according to a recent study co-sponsored by the National Bureau of Standards and the Privacy Protection Study Commission.

The study, directed by Alan F. Westin, Columbia University public law and government professor, resulted in the publication of "Computers, Personnel Administration and Citizen Rights." In the report, Westin cited six guiding principles for data collectors and two possible courses of action to protect citizens from such organizations.

The first conclusion of the study

team was that decisions about an individual's rights, benefits and opportunities in society should not be made by organizations on the basis of secret files or procedures about which individuals have not been informed. Furthermore, only information relevant to the organization's legitimate purposes should be collected and stored, and the definition of relevance must respect guarantees of privacy and legislative prohibitions against discriminatory decisions.

The report also recommended that managers of data systems take "reasonable steps" to ensure that the records they keep are accurate, timely and complete, as measured by the kinds of uses made of the data and the social impact of their use. In addition, the

study found that detailed rules of confidentiality should govern the granting of access to records data-collecting organizations, and that access should be given on a need-to-know basis.

Disclosure of personal data outside the organization that collected it should be made only with the informed and voluntary consent of the individual, obtained at the time of collection, by subsequent query or under a constitutionally valid legal order.

Finally, an individual should have a right to see his record and should have an effective procedure for contesting the accuracy, timeliness and pertinence of the information in it, the study found. Although there may be some exceptions to this right of inspection, as in the interests of protecting confi-

dential law enforcement sources, these should be rare.

In conducting the study, Westin's group interviewed organization managers, personnel specialists, computer software and system developers, public interest and civil liberties groups, regulatory agency officials and labor union representatives. The study entailed on-site examinations of the personnel practices of the U.S. Civil Service Commission, the U.S. Air Force and Bank of America, supplemented by sketches of five business firms. The project also analyzed the uses of DP in 37 state governments.

While Westin considers state legislative actions the most effective means of ensuring personal privacy, he indicated that another alternative is to encourage the voluntary adoption of fair information principles by private employers and by state and local agencies in states lacking fair information practice laws.

Attitude Survey

As part of the study, an attitude survey was taken of employees and executives. The survey revealed that half the workers and executives contacted considered personal records kept by employers "very important" in terms of privacy, and almost 60% regard a general rights to see . . . their personal records as equally important.

Almost a third of the workers surveyed, however, did not know whether they could see their personnel records or performance appraisal. Furthermore, almost half felt that employment records present a more worrisome confidentiality problem when they are computerized.

Westin concluded that, in general, the use of automated files does not result in an increase in the kind or amount of personal information collected on employees. In fact, there is a trend toward giving employees a periodic printout of their automated records, primarily to ensure accuracy and obtain updated information, Westin found. Individual organizational policies, however, determine whether some management evaluation items are excluded from employee review, he noted.

Although DP systems can accommodate any rule an organization might have about sharing or compartmentalizing employee data within the organization, Westin said, privacy considerations still have not had a significant impact on the design or general formats of personnel data systems.

The 465-page paperback report (NBS Special Publication 500-50) costs \$8 and can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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Software House

The Data Base



End to Imported Programmers? Pressure Mounts for Crackdown on B1 Permits

By Tom Henkel

CW Staff

WASHINGTON, D.C. — It was fun while it lasted, but we can live without it.

That was one professional recruiter's reaction to increased governmental pressure to stop foreign DPers — principally Britons — from coming into the U.S. on B1, or business convenience permits.

Vague wording of the temporary visitor regulations in the U.S. visa statute has given U.S. consulates the discretionary power to grant B1 visas to DPers who plan to work for U.S. companies for up to a year. Pressure from labor groups as well as from the Department of Labor, however, might encourage the State Department to crack down on the practice, forcing the consulates to issue the harder-to-get H2

visas to temporary workers in the U.S. [CW, July 16].

Herb Halbrecht, president of Halbrecht and Associates, a Stamford, Conn. — based recruiting firm, doesn't doubt that use of B1 visas for British consultants on extended loan to U.S. firms is wrong. However, B1 permits are much easier to get than H2 permits, which grant temporary worker status.

In a recent interview, Halbrecht spoke freely of his company's plans to bring about 280 British DPers to the U.S. on B1 permits. The Britons are to be hired through Halbrecht's London affiliate — a DP consulting firm — and leased to nine "multibillion-

dollar" firms in the U.S.

If the State Department cracks down on U.S. consulates liberally granting B1 permits, Halbrecht will probably go out of the imported programmer business, he said, and concentrate on his established highlevel management recruitment business — which Halbrecht says is more profitable anyway.

But the end of British DP imports will, in Halbrecht's opinion, be the end of a good deal for U.S. DP firms.

"It's a tremendous deal for [U.S.] employers and [DP] professionals in England. Nobody wants to go and bring in people from Britain except as a last resort. The notion that we're bringing

(Continued on Page 12)

Grow — Or Raid

STAMFORD, Conn. — Where will tomorrow's top-level DPers come from? Just about anywhere, a professional recruiter here said.

With high-level people in ever-shortening supply, employers are quickly approaching a fork in the DP trail. Both paths may seem rocky roads to some DP organizations but, according to the head of Halbrecht and Associates, they can either lower their standards and "grow" tomorrow's leaders from inside the firm or "sweat."

The latter choice means employers will have to pay more and look harder before they can raid experienced DPers from other companies.

Training will be the key to the future in DP installations, Herb Halbrecht said. The idea that DPers must have a bachelor's degree in computer science and at least two years' experience before a major DP employer will consider him for an entry-level position will have to change.

Halbrecht outlined three possible sources for tomorrow's DPers:

- Liberal arts graduates, who have proven they can learn by obtaining a BA degree, will rank tops on the list.
- Internal clerical help who can spend about 50 % of their time learning how to program or operate a computer will also rank high.

• A third alternative will be the unskilled worker without much formal education. Halbrecht said members of this group can show remarkable results if trained properly.

"Companies have got to learn to grow their own and make an investment. I don't understand why companies don't do more on-the-job training with people who know what they're doing [instead of taking people] from

some of these crappy programming schools," Halbrecht said.



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'Murder, eh? I'm in for Bending, Folding and Mutilating Computer Cards.'

Nafec Building to Recycle Heat From DP Unit

By Marguerite Zientara

CW Staff

ATLANTIC CITY, N.J. — By recycling the heat generated by its large computer operations, the National Aviation Facilities Experimental Center (Nafec) expects to save 58% of the energy that would have been required to heat the 516,000 square feet of its Technical and Administrative Building, slated for completion next year.

The Ballinger Co., the architectural firm in charge of Nafec's \$50 million building program, designed a heating, ventilating and air conditioning system that will use a double-bundle condenser and a variable air volume system for an energy savings of 13% above the government-decreed minimum, according to a Nafec spokes-

man.

Government regulations dictate that all new federally owned or leased buildings must be designed for energy savings of at least 45% by 1985, compared with similar buildings designed in 1975 or earlier.

The energy savings will amount to \$250,000 a year or more, based on today's fuel costs, according to Thomas F. Brennan Jr., Nafec's building program manager. The savings were calculated using a Trane Co. computer analysis run by Ballinger.

Path of Heating System

In essence, this is how the system will work: heat picked up from the computer operations will be used to warm water, which then flows through an

evaporator. The Freon refrigerant, used to cool the water in the evaporator, will be cycled through the double-bundle condenser, where heat will be recovered and recycled through the building.

This recycled heat will be pumped through a perimeter heating system inside the exterior walls of the building to maintain a minimum temperature of 65°F during the winter. It will also be used to heat water used by employees to a maximum of 105°F.

On winter days, when the temperature drops below predicted levels, additional heat will be provided by one of the two boilers in the center's central utility plant.

While similar to the design of the commonly used single-bundle con-

denser, a double-bundle condenser will recover and recycle heat that previously would have been wasted, Nafec noted.

Approximately 11% of the projected 58% in energy savings will come from conventional sources such as insulation and tinted glass. Another 6% will result from the use of a variable air volume system of ventilation.

Many Expecting B1 Crackdown

(Continued from Page 11)

people in to undercut [U.S.] wages is nonsense. Employers are doing it because they have to get the jobs done."

British DPs "are a drop in the bucket. We're talking about a few hundred people. If you took all the people in my business doing this kind of recruiting, there is no way we would expect to bring in an aggregate of more than 2,000 a year. Compare that to 20,000 to 30,000 shortages; it's trivial," Halbrecht said.

Even if British DPs are a drop in the U.S. employment bucket, their absence could mean serious drought for DP organizations.

For large companies in large cities, the DP body crunch will get even tighter, forcing firms to pay "obscene amounts of money" for lower quality employees, Halbrecht said.

For large employers in small towns, the outlook is even worse. Lacking a big employee base to draw from, rural DP organizations will "really be up against it" to find needed people.

"In both cases they'll be bringing in contract programming houses and finding they can't get the best caliber of people," Halbrecht predicted.

Another possibility is that large DP firms might scout smaller software houses for decent programmers, steal the programmers at above average salaries and fire them when the project is completed, he added.

Possible Deportation

For British DPs already in the U.S. on B1 permits, a State Department crackdown could mean deportation if the Immigration and Naturalization Service (INS) determines a B1 permit was wrongly issued, according to Carl Shepherd of the State Department's Advisory Opinions Division.

Although the State Department issues visas abroad, once a foreigner enters the U.S. he is under the jurisdiction of INS — a division of the Justice Department.

Although it could mean the boot for British DPs in the U.S. and tighter supplies for employers, intermediaries such as Halbrecht will go virtually unscathed if the State Department cracks down on the issuance of B1 permits.

It would be tough to prove there was any wrongdoing on the part of the recruiters who brought British DPs into the country. There could be some legal action taken against recruiters if the State Department could prove they willingly tried to circumvent the Immigration and Naturalization Act; however, for most, the State Department will probably find the recruiters simply took advantage of liberal rulings by U.S. consulates, according to Shepherd.

FEATURE COMPARISON CHART

FEATURE	Visual 200	Hazeltine 1500	Hazeltine 1420	Lear Siegler ADM-3A	Digital VT-52	ADDS S20	ADDS Regent 20	ADDS Regent 40
24 x 80 Screen Format	STD	STD	STD	STD	STD	STD	STD	STD
7 x 9 Dot Matrix	STD	STD	NO	NO	NO	NO	NO	NO
Background/Foreground	STD	STD	STD	NO	NO	NO	NO	STD
Insert/Delete Line	STD	STD	NO	NO	NO	NO	NO	STD
Insert/Delete Character	STD	NO	NO	NO	NO	NO	NO	NO
Clear End Line/Field/Page	STD	STD	NO	NO	STD	NO	NO	NO
Blink	STD	NO	STD	NO	NO	NO	NO	STD
Security Mode	STD	NO	STD	NO	NO	NO	NO	STD
Columnar and Field Tab	STD	NO	STD	NO	NO	NO	NO	STD
Line Drawing	STD	NO	NO	NO	STD	NO	NO	STD
Upper/Lower Case	STD	STD	STD	OPT	STD	NO	STD	STD
Numeric Pad	STD	STD	STD	OPT	STD	NO	NO	STD
Composite Video	STD	NO	NO	NO	NO	STD	NO	NO
Current Loop	STD	STD	NO	OPT	OPT	STD	STD	STD
Serial Copy Port	STD	STD	OPT	STD	OPT	NO	STD	STD
Hold Screen	STD	NO	NO	NO	STD	NO	NO	NO
Detachable Keyboard	STD	NO	NO	NO	NO	NO	NO	NO
Solid State Keyboard	STD	NO	NO	NO	NO	STD	STD	STD
Typematic Keys	STD	STD	STD	NO	NO	STD	STD	STD
Cursor Addressing	STD	STD	STD	STD	STD	STD	STD	STD
Read Cursor Address	STD	STD	STD	NO	NO	NO	NO	STD
Cursor Control Keys	STD	NO	STD	NO	STD	NO	NO	STD
Secondary Channel	STD	NO	NO	STD	NO	STD	NO	NO
Self Test	STD	NO	STD	NO	NO	NO	NO	STD
Baud Rate to 19,200	STD	STD	NO	STD	NO	NO	NO	NO
Smooth Scroll	STD	NO	NO	NO	NO	NO	NO	NO
Microprocessor	STD	STD	STD	NO	STD	NO	STD	STD
Tilt Screen	STD	NO	NO	NO	NO	NO	NO	NO
Switchable Emulations	STD	NO	NO	NO	NO	NO	NO	NO

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Within Next Decade, Expert Says Air Controllers Seen Going to Voice Data Entry

By Marguerite Zientara
CW Staff

ATLANTIC CITY, N.J. — Voice data entry will be widespread in the field of air traffic control within the next decade, according to the National Aviation Facilities Experimental Center's (NAFEC) expert on the subject.

While work on voice recognition systems has been going on for about 30 years, the technology has only recently advanced to the level of "phrase recognition" as opposed to "isolated word recognition," according to Dr. Donald W. Connolly. The object of the research has been to develop the technology to enable the lay person to instruct a computer using a microphone instead of by entering encoded instructions through a keyboard.

In addition to eliminating the need for a middleman, or data entry clerk, voice data entry systems would speed up data entry, reduce errors and "cut the umbilical cord" that ties a controller to a keyboard, Connolly said. It would give the air traffic controller mobility and allow him to use his hands and eyes for other tasks.

In air traffic control, that is an espe-

cially crucial freedom, according to Connolly, because controllers presently must key in any altitude or flight plan changes requested by a pilot in flight. "While he is entering the information into the data base, the controller's mind and eyes are not on the system, keeping track of the airplanes on his radarscope," Connolly pointed out.

An individual word recognition system would save a controller at least three minutes per 100 messages, while a phrase recognition system would save four or more minutes per 100 messages compared with keyboard entry, Connolly estimated. Currently, an en route air traffic controller — who "works" airplanes between airports — averages one keystroke about every five seconds during peak hours.

More Accurate

While voice data entry yields obvious benefits for the controller in terms of increased speed and fewer distractions, one might ask whether the system is accurate enough for an application involving air safety.

According to Connolly, voice data entry is more accurate than keyboard entry. "All of the keyboard languages used with computers are artificial or encoded languages," he said. Natural language is never typed into a computer, but must be translated into language the computer will understand in order to process the information.

"It's one thing for a skilled typist to copy material for input to a computer, but it's something else for a person who is not and should not be a typist to create, translate and enter information in an artificial, contrived language," Connolly maintained.

The accuracy of voice data entry is also guaranteed by the presence of a CRT screen to display input information for confirmation by the controller, he noted.

"Training" System

Both isolated-word recognition systems and connected-speech recognition systems are user-dependent and must be "trained" to recognize an individual's speech pattern, which they can do regardless of accent or tempo.

With a phrase-recognition system, the user can train the machine by speaking each word or phrase once into the machine. Digits must be spoken twice. This compares with the seven to 10 repetitions required by a single-word recognition machine, Connolly said.

The number of different voices a single machine can recognize is unlimited. And while a machine can be trained to understand words spoken by any voice, air traffic control applications would demand the fail-safe "training" method, Connolly noted.

While Connolly expects voice data entry to be widespread among en route air traffic controllers working with radarscopes within 10 years, he predicted that airport control towers, which use large windows for visual verification, will implement such systems much sooner — "in less than five years."

The reasons for this are partly economic, according to Connolly. The

control tower, or "cab," systems are in an "improvement and development program" under Federal Aviation Administration jurisdiction, "so the economic process of upgrading and modernizing the control tower system and properly interfacing it with the rest of the computer-based system is under way."

'Constant Motion'

Furthermore, controllers in such tower cabs "rarely sit down and cannot be tied down [to a keyboard] because they are in almost constant motion," Connolly observed. Their computer data entry requirements must therefore be filled by means other than keyboard entry.

"All you need for voice data entry is a microphone," he explained. Connolly visualizes controllers using lightweight headset microphones and wearing "small on-off switches" hooked to their belts. Presently, tower cab controllers enter data either by giving dictation to a keyboard operator located in the tower or by telephoning someone in the radar room.

A "sure-fire" voice data entry application in air traffic control will be aimed at avoiding ground collisions such as the one at Tenerife in the Canary Islands in 1977, in which 582 people were killed, Connolly said.

Currently under development is a "traffic light" system that will give pilots visual confirmation — by means of pulsing green lights on the runway — of the controller's go-ahead sign for takeoff.

"These guys in the control tower can't run around looking at maps and throwing switches," Connolly said. "They know what light they want turned on and what light they don't want turned on, and all they'll have to do is say it."

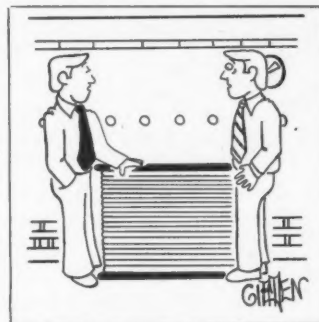
None of these systems is being "built by the hundreds" anywhere. Rather, they all are in the development

or evaluation stages. The future use of such systems is "a function of the entire federal budget and of the priority planning system, which changes as the state of the world changes."

Connolly noted that voice data entry systems would not require any more memory in air traffic control computers than is presently required. And isolated-word systems do not cost much more than keyboard systems. Phrase-recognition systems, however, which would be more efficient, would also be more expensive.

In evaluating voice data entry applications as well as in trying to improve existing voice data entry systems, Connolly uses a Threshold Technology, Inc. system based on a Data General Corp. Nova minicomputer with 32K of 16-bit words. He also works with a recently acquired Nippon Electric Co., Ltd. system based on three Nippon microcomputers that draw on a central memory of 4K words of random-access memory.

While the Threshold system is a word-recognition machine, and the Nippon system a more advanced phrase-recognition system, Connolly plans to connect the two for further refinement of the science.



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Scientists' Mainframe Outputting a Lot of Bull

By Tom Henkel

CW Staff

WASHINGTON, D.C. — Here at the U.S. Department of Agriculture's Animal Improvement Program Laboratory (AIPL), computerization is a lot of bull. Superbull.

That's what the laboratory's scientists are working to develop — a superbull capable of siring supercows that give more milk. A rating program, called the Cow Index, is run on an IBM 370/168 and traces a bovine's ancestry. Based on that information, scientists can analyze the genetic merit of bulls and predict the volume of milk his off-

spring will produce.

Only about half the number of dairy cattle are raised today as 30 years ago, so the scientists' efforts aren't a drop in the bucket. However, those cows produce about the same volume — about 120 billion pounds — of milk, a feat AIPL head Frank Dickinson said is a direct result of genetic research.

"If we hadn't been consistently improving the genetics and management of dairy herds, the milk industry would be slipping down the drain, and we might be faced with relying on foreign countries for dairy products like we are for gas," Dickinson said.

"We realize a 1% genetic improvement in cows every year. In 30 years, cows have more than doubled their milk production," Dickinson added.

'Report Cards'

Twice a year, AIPL receives data from monthly tests conducted on dairy farms that subscribe to the service. Bulk weights of milk produced from each cow — which are identified either by number or name — are then entered into the 370/168.


Farmers, who pay 60 to 70 cents per cow for the service, then get a printout "report card" on each cow's milk output.

Since most of today's cows are produced through artificial insemination, a little bull can go a long way. "Farm-

ers used to think it didn't matter what bull or semen they used for breeding," but today most farmers consult the index before buying a bull or semen for breeding, Dickinson noted.

In addition to identifying superbulls, the program can identify the unfortunates who aren't so super. "The owner might not notice that a small number of his cows have repeatedly failed to get pregnant. The computer picks up the pattern," Dickinson said.

The program can also guard against cattle rustlers because it requires the farmer to number or name each of his cows. When he checks the report card with each cow, he automatically takes inventory of the herd, Dickinson pointed out.



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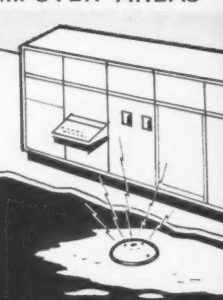
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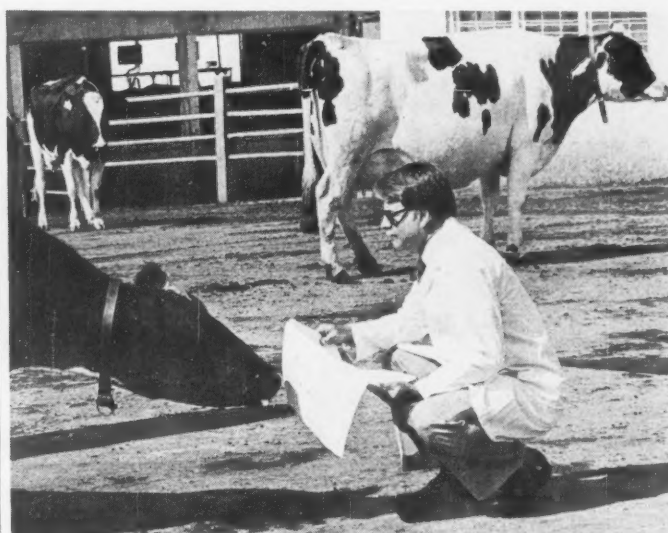
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On one recent report card day for cattle at the Department of Agriculture Research Center in Beltsville, Md., this prize heifer seemed very concerned about her marks. She is shown consulting with Frank Dickinson, director of the Animal Improvement Program Laboratory.

Software Consultants Issue Challenge to Chess Players

CAMBRIDGE, Mass. — Claiming to staff some of the best chess players in the country, a software consulting firm here says it can beat anyone — in fact, it issued a challenge to that effect in a recent *Wall Street Journal* advertisement.

In what it admitted is a ploy to drum up business, Cambridge Computer Associates, Inc. will take on the top four chess players of any company, government agency — or even a computerized chess program, according to company spokeswoman Linda Russell.

Since the ad appeared Aug. 22, the company has received about a dozen responses. Included in the responses were several offers to buy the company and one resume from an unemployed chess fiend.

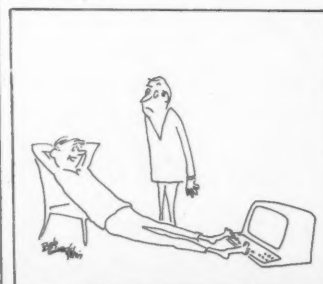
The firm is now sending copies of the ad to major mainframers with in-house chess clubs. No matches have yet been arranged.

"I'm very hopeful we'll have one with Digital Equipment Corp. We would like very much to play IBM, but so far we haven't heard from it. We're very negotiable; if IBM wanted to play us, we would probably go there," Russell said.

"We've never claimed to hire people with the ability to play chess. It turns out some of the people here know other people from chess clubs who have also been good programmers. So we have acquired people through other chess players," she explained.

The team's motto is "We move knights and bytes with equal flair."

For those thinking of picking up the gauntlet, Cambridge Computer Associates' address is 222 Alewife Brook Parkway, Cambridge, Mass. 02138.



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World's Largest Collection of Telescopes Systems Help Open 'Window to the Universe'

By Tim Scannell
CW Staff

QUINLAN MOUNTAINS, Ariz. — The Papago Indians here leased a portion of their vast reservation to the federal government more than 21 years ago and in doing so opened a window to the universe.

Located atop a 6,800-foot mountain 56 miles southwest of Tucson, Kitt Peak National Observatory is the world's largest collection of solar and infrared telescopes, computers and sophisticated scientific machinery. The observatory, funded by the National Science Foundation (NSF), is managed by a partnership of 12 American universities and used by nearly 300 visiting scientists from around the globe each year.

In addition, the complex supports a full-time staff of stellar investigators who not only use the observatory's facilities but are responsible for maintaining the site's 14 telescopes and for developing new equipment, according to staff scientist Dr. Larry Goad.

While human scientists usually peer through the giant, highly polished scopes and gaze at the stars, an assortment of computers control the movements of the optical monsters and digest the tremendous amount of data collected by them.

"Generally speaking, though it is not always the case, one computer runs the telescope and the instruments and another computer is used as a backup for that system . . . or by the observer for running data analysis routines," Goad explained. "Most of the instruments, such as spectrographs and cameras, have various interfaces to the computer so that they can be configured and aligned by computer control."

In all, there are 17 minicomputers at the complex, most of which are Univac (formerly Varian) Model 620s with 32K words of memory each, Goad said. A Digital Equip-



Kitt Peak National Observatory

ment Corp. LSI-11 microprocessor aids systems development at Kitt Peak, and a Varian V74 links a number of interactive terminals at the observatory to a Control Data Corp. 6400 mainframe at the center's city block-long headquarters in downtown Tucson.

Largest Scope

The observatory's largest optical instrument, in terms of light-gathering power, is the four-meter Mayall telescope housed in the 19-story building located on the mountain's highest point.

A colossal camera, the massive metal and glass structure — whose mirrors were ground and polished at the observatory — is used primarily for nighttime observations and occasionally for daytime infrared sightings, Goad said.

Because the Mayall telescope is the newest instrument at Kitt Peak — it has been operational only since 1974 — it relies more on computer control for mobility than other telescopes on the mountaintop. In fact, computers control and monitor more than 50 different mechanisms connected to the Mayall's operation and are programmed to analyze even the faintest object picked up by the instrument's 15-ton primary mirror.

A digital video camera interfaced to the Mayall was designed to record images that can be almost imperceptible to

the human eye. The camera's outboard recyclable memory can be dumped to an on-line computer system and magnetic tape or disk approximately once every five minutes, Goad noted.

"Once it gets into the computer, there are routines available to the astronomer for manipulating the picture and for doing what we call 'picture arithmetic operations,'" the staff scientist stated. Basically, this computer process would electronically extract extraneous background material from each solar picture. Broken up into literally millions of 16-bit imagery data elements, each picture or frame takes about four or five minutes to be re-

displayed by the computer, Goad said.

Fourier Transforms

Linked to both the Mayall telescope and the 1.5 meter McMath solar telescope are Fourier transform spectrometry instruments for high-resolution infrared and high-resolution solar observations, respectively.

"Nobody can look at a Fourier transform of a spectrum and tell you what the spectrum's going to look like," Goad said, commenting on the necessity for the computer. "The computer is responsible for getting data directly from the instrument and recording it. In addition, another computer system is used with the instrument to do quick reductions on the mountain so that the astronomer can see exactly what data he is gathering."

According to Goad, each Fourier transform collected by the telescopes is approximately 200 million points long, and the computer has to constantly sort and re-sort the data segment by segment until a medium-resolution picture of a specific part of the spectrum is produced.

The observatory's 1.3 meter "daytime" telescope, like the Mayall, is heavily dependent on computers because it provides broadband photometry of stars that are invisible to astronomers because of the sun's

intensity. The computer, in fact, has to point the telescope for the "blind" stellar scientist, Goad added.

Guided by the positions of about 100 stars that are faintly visible in the daytime sky, astronomers tell the computer approximately where the invisible sun-blocked stars they want to observe are located, and the computer moves the motorized telescope to the new position.

Speckle Interferometry

Another application of computers and astronomy at the observatory is in the science of speckle interferometry. The computer takes thousands of photographs of a single star at exposures of about 10 milliseconds each, Goad explained. The Varian machine then analyzes the amount of interference of the star light with itself as it passes through the Earth's atmosphere and constructs a profile of that star.

"By taking a lot of short exposures and adding them up, you can mathematically unblur many of the features of the [star] image," Goad observed.

However, a few problems on the astronomical mount do cause occasional headaches and could result in future set-

backs. At least two or three of the Varian computers are constantly in the observatory's shop for either routine maintenance or because of failed components.

"The Varian 620s are getting to be rather old machines," Goad said, "and we have to be careful in maintaining them."

To curtail any major problems, the observatory plans to shop around for new computers within the next couple of months, Goad reported.

Kitt Peak has also been having a few minor problems with the electricity that powers both the computers and the telescope's massive motors. "Power on the mountain is exceptionally dirty," Goad said. The observatory's facilities have been victimized by numerous "lightning spikes." A series of motor generators isolate the delicate equipment from power fluctuations at least 95% of the time, and it is not unusual for the observatory's lights to flicker.

The service provided by the local electric cooperative is "sometimes not 100% reliable and will go out entirely," Goad added. But the generator switchover is usually "automatic and smooth enough so that the computers will stay up through it."

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Calendar

Oct. 10, New York — **Women in Data Processing.** Contact: Women in Data processing, 275 Madison Ave., New York, N.Y. 10016.

Oct. 15-17, Amsterdam — **The Factory of the Future.** Contact: Alan Morton, Leedex Ltd., 100 Whitechapel Road, London E1 1JB, England.

Oct. 18-19, Minneapolis — **Proposal Preparation and Source Selection.** Contact: Technical Marketing Society

of America, Suite 1016, 5959 W. Century Road, Los Angeles, Calif. 90045.

Oct. 18-19, Des Moines, Iowa — **Microcomputers — Making Them Work for You.** Contact: Association for Educational Data Systems, 1201 16 St. N.W., Washington, D.C. 20036.

Oct. 21-25, Houston — **DP and Data Communications Conference.** Contact: National Retail Marketing Asso-

ciation, Information Systems Division, 100 W. 31 St., New York, N.Y. 10001.

Oct. 22-23, Bangor, Maine — **Cobol Programming Workshop.** Contact: Foundation for Continuing Education, 15 School St., Boston, Mass. 02108.

Oct. 22-23, Chicago — **Executive Productivity.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 22-24, Los Angeles — **Computer Performance Measurement.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 22-24, Washington, D.C. — **Ninth Annual Conference of the Association for Computer Programmers and Analysts.** Contact: DBD Systems, Inc., 1500 N. Beauregard St., Alexandria, Va. 22311.

Oct. 22-24, Chicago — **The Automated Office.** Contact: American Institute of Industrial Engineers, Seminars, Box 3727, Santa Monica, Calif. 90403.

Oct. 22-26, Los Angeles — **Future Strategy, Management and Design.** Contact: Technology Transfer Institute, Box 49765, Los Angeles, Calif. 90049.

Oct. 22-26, San Francisco — **Data Base Concepts and Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 22-26, New York — **Blueprinting the Future.** Contact: Langston & Kitch Associates, 715 E. 8 St., Topeka, Kan. 66607.

Oct. 22-26, Marina Del Ray, Calif. — **Software Configuration Management.** Contact: Software Management Training Institute, 2239 Towngate Road, Westlake Village, Calif. 91361.

Oct. 23-25, Orlando, Fla. — **Government and Industry Data Exchange.** Contact: Dennis Starling, Datagraphix, Inc., Box 82449, San Diego, Calif. 92138.

Oct. 24-26, San Francisco — **Data Communications: Effective Network Design.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-26, Washington, D.C. — **Digital Image Productivity.** Contact: Technology Transfer Institute, Box 49765, Los Angeles, Calif. 90049.

Oct. 24-26, New Orleans — **Fundamental of Finance and Accounting for Non Finance Executives.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 25-26, Houston — **Data Communications: Advanced Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 28-Nov. 1, Miami, Fla. — **Distributed Data Processors Conference.** Contact: International Data Corp., 314 Third Ave., Waltham, Mass. 02254.

Oct. 29-31, San Francisco — **Distributing Data Processing, Data Communications and Networks, Minicomputers.** Contact: AIIE Computer Society, Box 3727, Santa Monica, Calif. 90403.

Oct. 29-31, New York — **Managing the Electronic Office,** co-sponsored by the Office of the Future and Auerbach Publishing, Inc. Contact: Office of the Future, 700 2 Blvd., Guttenburg, N.J. 07093.

Oct. 29-31, Washington, D.C. — **National Conference of Information Systems,** sponsored by the Association of Government Accountants. Contact: Ken Burroughs, DBD Systems, 1500 N. Beauregard St., Alexandria, Va. 22311.

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Predicts Population Trends Mini Enlisted in War on Crop-Eating Insects

Rory O'Connor

Special to CW

COLLEGE STATION, Texas — A cotton field might seem a strange place to encounter a computer, but many Texas growers are finding it less strange as computers help them to combat insects. That's what an IBM 5100 minicomputer is doing, using software developed here at Texas A&M University. The mini can be operated by entomologists just about anywhere it can be plugged in.

The Texas Agricultural Extension Service, using the MOTHZV package, is predicting bollworm and tobacco budworm population trends for a sixty- to ninety-day period. Data collected at the site is fed into the 5100, which is brought to the location in a

van or auto. Data produced at the site helps farmers to assess the effects of their methods of insect control, helping increase the crop yield.

The MOTHZV package was originally written in Fortran to run on the university's Amdahl Corp. 470V/6 processor. It was used for several years to predict insect trends in large areas, according to John Jackman of the Department of Entomology.

"We're making up to 20 regional predictions for a two-county area," said Jackman of the large Fortran version. When the package had been tested and the results verified, it was scaled down to a smaller APL version that was sent to the field with the IBM 5100. Built-in

cassette storage is used for programs and data, and a Model 1503 printer produces the results in hard copy.

Chosen for Portability

The 5100 was chosen "for portability," according to Jackman. "This was the first year we ever tried to look at specific field-to-field predictions. For the first time, we had the capability of making that [type of prediction] in the field where it could have done some good."

John W. Norman Jr., an entomologist with the Texas agricultural Extension Service, is one of the users of the field version of MOTHZV. He considers the results of his first hands-on experi-

ence with a computer to be very positive, saying that "within limited areas, we found [the computer] to be very accurate."

The university still makes predictions for large areas, using the mails to receive data and send out results. Insect traps are placed in several parts of each field, and counts are taken for 30 days or more. Those counts in turn are sent to Texas A&M for evaluation. The turnaround time, however, is about two weeks, Jackman said, adding "that's one of the reasons we're turning to a minicomputer."

The program, which was first used in the Rio Grande Valley, is now being used statewide.

Directory Lists DP Consultants

SAN FRANCISCO — A directory listing more than 100 California-based consultants in management, computer technology and other fields is available from the Professional and Technical Consultants Association.

The directory was designed to make it easy for businesses to find the appropriate consultants for specific assignments. It contains a resume of each consultant and a cross index of skills. Hints are given on selecting and working with consultants. For companies requesting a copy on the company letterhead, the directory is free from Pacta, Suite 750, 681 Market St., San Francisco, Calif. 94105.

Call for Papers

WESTERN CONFERENCE & EXPOSITION, Anaheim, Calif., Jan. 9-11, 1980.

Papers are invited to address specific and comprehensive topics dealing with the broad theme of both strategic and tactical C² — command, control and communications.

Authors should obtain company and/or military clearance prior to submission of papers. One page abstracts and short biographies must be received by the national headquarters of the Armed Forces Communications and Electronics Association (AFCEA) no later than Sept. 15, 1979. The title of paper should be included.

Abstracts and papers should be submitted to BGen. Lawrence E. Adams, U.S.A. (Ret.), AFCEA National Headquarters, Suite 300, One Skyline Place, 5205 Leesburg Pike, Falls Church, Va. 22041.

TENTH CONFERENCE OF COMPUTER AUDIT, CONTROL AND SECURITY, San Francisco, Calif., April 28 - May 2, 1980.

Papers should deal with work or study conducted in DP audit, control and security that will be of interest to other professionals in the field. The program chairman is specifically looking for papers detailing new approaches to problems in DP audit, control and security or pioneer work in advanced systems. Case histories are welcome.

One-page abstracts of papers, along with brief personal resumes, including business telephone numbers, should be sent no later than Oct. 15, 1979, to Harold Weiss, Program Chairman, Automation Training Center, Inc., Suite 17, 11250 Roger Bacon Drive, Reston, Va. 22090.

FIFTH INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, Atlanta, Ga. Oct. 27-30, 1980.

The following areas are suggested for submitted papers: 1) broad needs and requirements, societal requirements for communications and information transfer, the role of communications in economic development, technology assessment, demand forecasting and marketing, standardization and interconnection, public vs. private networks and integrated network services. 2) Social implications, national and international policies, economic and legal considerations, social constraints on information transfer, privacy and security, governmental regulation and participation and protection of personal rights. 3) Applications, experiences of operating networks and information access for personal and professional use.

All papers must be original, not published previously, written and presented in English and no more than 5000 words in length.

Manuscripts must be typed, double-spaced, on one side of the paper only. A cover page must give the title, the full names of the authors, the affiliation of each author and the name, address and telephone number of the primary author. A 100- to 200-word abstract and a full set of illustrations must accompany the manuscript. Six copies of these materials must be sent by March 1, 1980 to Dr. J. Saltz, Program Chairman, Bell Laboratories IG-509, Holmdel, N.J. 07733.

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EDITORIAL

Waiting for the 4300 . . .

Many users surveyed recently by *Computerworld* were unhappy with the projected delivery dates for 4300 systems and a large number were looking at alternative sources of supply [CW, Sept. 3].

This is a healthy sign. There are many things users can do in the interim to supply their organizations with the needed computing power — from acquiring interim upgrades from IBM or third-party sources to contracting with firms who market IBM-software-compatible computers.

However, it is surprising in this day and age to find that many DPs will not even consider alternative sources of supply. As one in the survey said: "We're not happy, but what can you do?"

This is an unhealthy attitude. DP managers owe it to their corporations to investigate all of the alternatives and not just wait for "Big Blue" to determine their fate.

Many of these users are leery of software-compatible machines or other independent sources. This is fine, for clearly the software-compatibles are not for everybody, and other sources of supply may not be able to satisfy a specific user's needs.

But users who fail to even look at the alternatives are not serving their organizations well.

Only by evaluating alternatives fairly, even if a little skeptically, will users be able to determine whether they meet their needs.

If a DP manager fails to follow through on these investigations, his organization should take a hard — and skeptical — look at him.

. . . And Juggling the Dates

It may just be a case of the squeaky wheel getting the grease, but it appears that IBM is willing to juggle delivery dates on the 4300 series of mainframes for users who complain loudly enough.

Both Harvard University's School of Public Health and the Indianapolis Power and Light Co. recently reported that they were able to get much earlier deliveries than originally planned.

Both organizations had complained to IBM about the late delivery dates and both had indicated a willingness to accept less than their total orders if they could get earlier delivery.

Their success should be food for thought for all users who are unhappy with their present delivery schedules. By complaining loudly and by being willing to compromise with IBM, many users may be able to get earlier deliveries.

DATA PAST

Eight Years Ago Sept. 8, 1971

WASHINGTON, D.C. — The Federal Bureau of Investigation decided to attach the computerized National Criminal History System (NCHS) to its smaller and significantly different but already operating National Crime Information Center (NCIC). Observers likened the plan to grafting an elephant onto a flea.

WASHINGTON, D.C. — The "Occupational Manpower and Training Needs" study released by the Depart-

ment of Labor's Bureau of Labor Statistics predicted that the number of jobs in DP would increase by 129% by 1980.

Five Years Ago Sept. 11, 1974

DETROIT — Burroughs Corp. doubled the effective throughput of its large-scale 7700 series by combining upgraded software and improved utilization of instruction logic. The new processor retained the same number designation (7701) as the older model but employed an enlarged Local Processor Memory.



LETTERS

This Is Progress?

IBM announced a six-to-nine month delay in System/38 shipments and two weeks later *Computerworld* had a front-page story on how relieved the users are [Aug. 27].

Two things are immediately apparent: First, the world is still full of DP managers who order the newest, fastest whiz on the market whether they need it or not. Second, IBM could announce a machine that automatically breaks down and *Computerworld* would line up 10 users to rave about the repair service.

I can't say that either interpretation says much about the progress of this industry.

Robert Hahn

Washington, D.C.

Topic for NCC '80

This is written in response to Peter Kushkowski's recent letter complaining about the National Computer Conference's lack of responsiveness and neglect of real-time, sensor-based, process computer applications [CW, July 23].

As a member of the 1980 NCC Conference Program Committee, I would like to apologize for this unresponsiveness. We are currently planning two sessions in the real-time processing area for next year's NCC: "Advances in Process Control" will be chaired by Dr. Edgar Bristol of the Foxboro Co. in Foxboro, Mass. And "Signal Processing with Microprocessors" will be chaired by Dr. George Bekey of the Department of Electrical Engineering at the University of Southern California at Los Angeles.

We certainly invite the participation of Kushkowski and others who are interested in this area. One problem in promoting areas like this at NCC is clearly circular — the lack of sessions discourages potential participants from attending and the lack of participants discourages the planning of sessions.

However, we are interested in trying new areas, new types of sessions and new approaches to the NCC program. The computer field is changing rapidly and the NCC must change with it.

Lance A. Leventhal
Technical Editor

Society for Computer Simulation
La Jolla, Calif.

Pessimistic on Micros

Joe Rigo is far more pessimistic about the future of microcomputers than I am ["Who's Doing All That Personal Computing," CW, Aug. 20].

The four customers he used as examples reminded me of the fellow who goes into a clothing store and buys a suit off the rack. When he gets the suit home, he finds the trouser legs are far too long, the coat doesn't fit around the shoulders and the waist is too big. He failed to have a tailor do his job.

I also disagree with his statement that "... [users] will have to wait patiently until IBM gets around to showing everyone else how to sell small systems. . . ." IBM doesn't have a corner on all the "smarts" in the world.

I respectfully submit that what is needed is qualified "tailors" to fit the system to the need. I further submit that the tailors be trained in:

- The fundamentals of hardware/software.
- The fundamentals of double entry accounting.
- How to "talk" the language of both the manufacturer and the end user, persuasively.

The trouble in selling microcomputer systems to small businessmen, I suspect, is that "over-qualified" people in a very narrow specialty simply can't look at the bigger picture and communicate in the buyer's language.

Literally hundreds of thousands of small mechanical bookkeeping machines out there will be replaced by electronic devices. That market will go to the vendor with the qualified tailors.

B.R. Mills

Fort Myers, Fla.

Bucking a Tide

Recent *Computerworld* articles have cited the dearth of female role models as the reason there are far too few women in management positions.

I agree that there are too few women in management, although we are making greater inroads into the lower levels of programming and analysis. However, I feel the lack of role models is only part of the problem.

Flipping through the rest of the publication, I noted a bit

of irony in the advertising. In virtually all photographs, the decision-maker or figure of authority is a male. If a clerk is present, she is sitting at a CRT or other piece of data entry equipment — usually with a man standing over her.

This seems to be a recurrent theme in most DP advertising.

The implications are obvious. Very very rarely is a woman pictured as a manage-

LETTERS

ment figure. And when she is, a male counterpart is standing next to her. Apparently, she's not capable of going it alone. Or, at least that's the conclusion one might draw, especially since the men are usually pictured on their own.

Of course, this advertising is being directed at the current predominantly male, DP management force. But it is also a sort of self-fulfilling proph-

ecy. Such advertising presents all too clear a picture of who belongs where in the DP environment. And it not only presents this picture to aspiring women, but to the men in management as well . . . the very men who hold the power to hire and promote women into these higher level positions.

Perhaps it's time for companies to reassess their advertis-

ing policies and the images they create. Women are bucking a tide, and such a constant, negative advertising theme only serves to reinforce the status quo.

Marcia W. Levy
S. Windsor, Conn.

Foreign Consultants

Here's a different point of view about the hiring of foreign consultants ["Recruiter Eases Hiring of Foreign Consultants," CW, Aug. 13].

While a shortage of domestic talent is admittedly a good reason for hiring foreigners, to do so without exhausting domestic resources of DP expertise is hardly practical, let alone fair.

As I understand it, British DP workers are accustomed to shorter hours, have a more causal attitude about the job, and their experience largely is in IBM 360 environments roughly 10 years behind us. My clients don't pay me \$200 per day unless I've put in 10 or more hours of concentrated, gossip-free work for it. And my clients find me readily available to trouble-shoot, or enhance, the business applications they've already paid to learn.

There are quite a few independent software consultants around. We work through agencies when we have to, but I certainly prefer to contract directly with my clients to ensure they don't have to pay extra money for anything other than production.

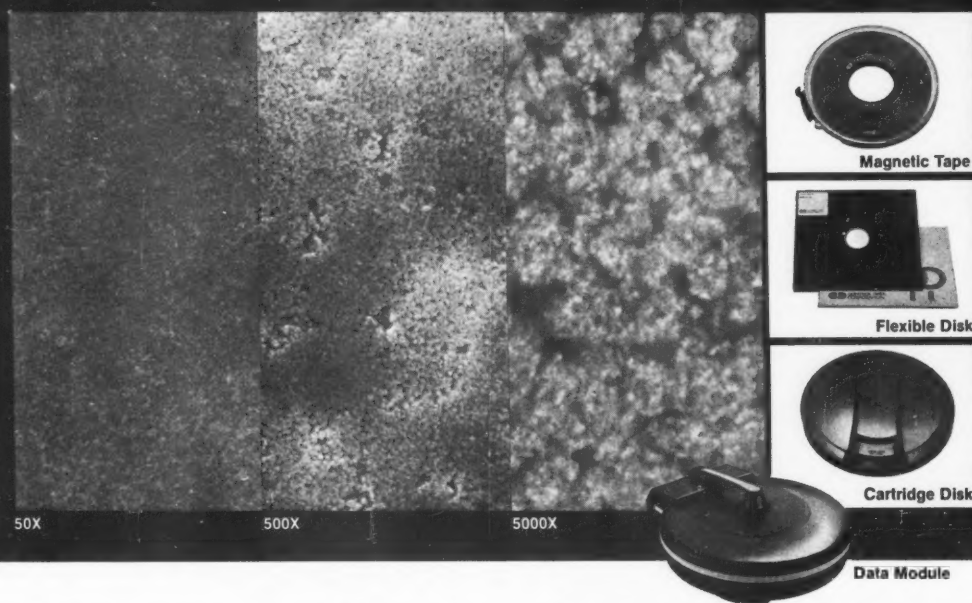
But when we give our all to a client, we have precious little time to spend thinking of ways to get the word out, with the result that nobody knows we're here.

I keep letters and brochures going out to potential clients, but I have no way of knowing when which potential clients need help.

One solution would be for companies that are contemplating importing DP talent to place advertisements in the industry press (CW rarely carries ads from companies calling for contractors) before hiring foreigners. This way, companies pay only a one-time fee (the price of an ad) for locating help with, believe me, just as much, or more, assurance of getting the kind of people they seek.

James F. Landers
Simi Valley, Calif.

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A close look at a section of disk through a scanning electron microscope taken at 50X, 500X and 5000X shows the magnetic oxide coating of the surface. The quality of the surface is of the utmost concern, because of the increasing requirement for higher densities.

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CW 9-10

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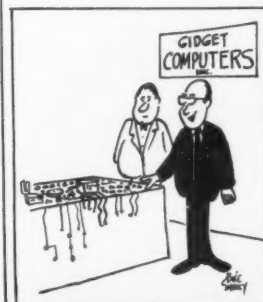
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Blood Center's System

As one of the "maverick" blood centers that have decided to develop their own software on non-IBM hardware ["Some Red Cross Centers Refuse Free Programs," CW, July 30] we would like to take the opportunity to state our accomplishments.

We received our Hewlett-Packard Co. HP 3000 Series II, Model 6 in October 1978 and went live with our donor recruitment system in December 1978, thereby eliminating any reliance on outside service organizations. From that point on, we have continued to increase the dramatic, positive effect of on-line, interactive processing in all areas of our organization. All our software is highly interactive, written in Cobol, utilizes HP's Image/3000 data base management system and its screen-handling facility, DEL/3000.

In the donor recruitment area, information on daily donations is captured through CRTs and is reported in many different ways to our 19 chapters on a weekly basis. Donor badges are printed for recognition and reports are produced for blood-type-specific recruiting throughout the region on a demand basis. In the laboratory-related area, this system automatically checks donors for a history of hepatitis involvement and cross-checks blood-type testing results for prior donors.

We also report on 23 classes of special donors from a medical point of view. Currently, 12,000 of the 180,000 donors we have on file fall into these categories.

Our billing system enables us to easily handle our multi-tiered pricing structure, inter-customer transfers and the usual receivable-related problems. We print our own invoices, so we bill all our customers directly, thereby greatly improving our cash flow. We derive much inventory control information from this system, which is helping us keep costs down and provide better utilization of blood and blood products throughout the region.

The important point here is that all of this software has been up and running live for quite some time. We cannot wait for someone else to do a job for us that we can better do ourselves.

Since ordering our HP 3000, we have not spent one dollar needlessly, as the CW article charged. Furthermore, the ease of upgradability of the system gives us the ability to expand our hardware as we need to, with no software conversion costs, so we will never be paying for computing capacity.

With the HP 3000, we will never need a "larger" machine. Combining these facts with

the benefits of Image/3000 and the clear advantages of interactive processing, comparisons with all other hardware and system software fall by wayside.

Kenneth W. Kobylski
Manager of
Information Systems
American Red Cross
Blood Services
Northern Ohio Region
Cleveland, Ohio

LETTERS

Accurate Article

As a trusting victim of "cookbook" courses in the past, I was particularly appreciative of Gopal Kapur's "Cookbook Approach to Structured Methodology" [CW, July 16].

The article conveyed the essence of all the hollow phrases and empty jargon behind which incompetent instructors

must hide.

The DP industry has very few critics, internal or otherwise, to keep us aware of the "oral flashers." I hope Kapur will continue his witty observations.

One scary thought: If I hadn't experienced a class just as he described, I might have taken his article seriously.

Evelyn Cane
Nashville, Tenn.

'Dilution' in Titles

I was puzzled by the survey results showing relatively small salary increases (5% and 6%) for several types of DPers ["Surprising Results," CW, July 16].

My thinking is that the mini-computer and distributed processing trend is causing a "dilution" in titles. Tiny one- or two-man installations may now have a "programmer" or "DP manager."

John F. Shannon
Northlake, Ill.

Why we put a one year warranty on our Eclipse* Add-In Memory.



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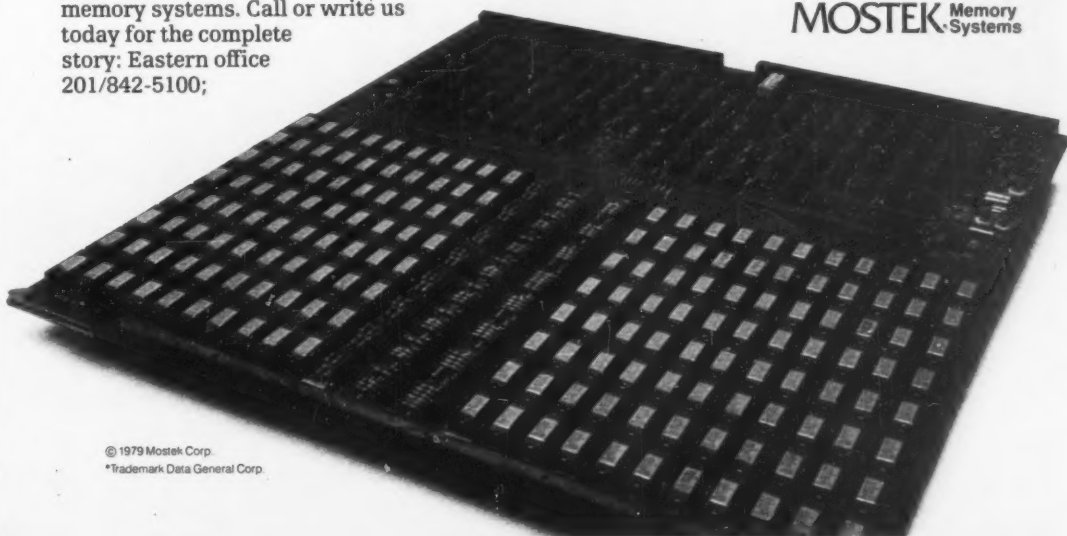
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Basics Often Ignored in Data Security

By Kathleen E. Porter

Special to CW

Data security requires a few basics that are, more frequently than not, forgotten. A typically well-run but vulnerable computer operation comes to mind.

Tougher 'N Kids Toy Co. was an aspiring young company whose founder, Joseph P. Genius, stumbled upon a willing market for his Tarzan and Jane swing sets. The

swing set business became a million-dollar enterprise, and the corporation began producing every toy it could convince the public it needed.

Because of its heavy production and sales, the company strongly relied on its computer service center, headed by J.T. Acronym. Efficiency was the name of the game when it came to the computer center.

Accounting and Production were impressed with the time-

liness of their reports. Marketing, with the help of sharp programmers, found its forecasts getting better and better.

In his zeal, J.T. had overlooked one detail: nestled behind the top-notch efficiency of the system rested a very vulnerable computer.

J.T.'s security system consisted of one fire extinguisher and double doors to the computer room (always unlocked). The flaw was discovered when

Charlie Gaap, the internal auditor, found \$50,000 and a systems analyst missing. The raw materials voucher and accounts payable had been tampered with.

Three Vulnerable Areas

Vulnerable areas of a computer operation can be divided into three categories: hardware, software and humans. A main concern of most computer centers is that of fire.

Along with the local fire department, a computer center manager can work out an effective fire protection plan.

There are many types of fire detectors available. The beam detector will sound an alarm when the beam is partially blocked by smoke. Beneath the floors, air ducts and tape and disk libraries, a spot detector is useful. It is always a good idea to have the alarm wired to ring at the fire department as well as the computer center.

Precautions are necessary when there is a remote chance of deliberate destruction to the hardware and data. One way to control the entrance to the computer room is to install an electronic device that uses cards to activate the door. This device can monitor who enters the room and at what time.

A second method is the lock and key system, allowing the door to be unlocked inside, ensuring exit during a power failure. The door can be opened from the outside with a key. Anyone entering the room, including operators, is required to sign in and punch a time clock. This system has to be watched closely.

Accidental damage to software and data can be avoided by eliminating potentially dangerous situations. In operations, for example, operators should never be allowed to make changes in programs (not even JCL) or override errors on the console. If operators find they can get away with altering programs, it can lead to something fraudulent.

Programmers should never be allowed to operate the computer, not even when an operator is supervising.

In a large organization, work schedules of operators can be rotated, making sure no operator works solely with any one production system. Rules requiring two people in the machine room at all times are a good idea.

When considering important data files, a reliable place off company grounds should be found to store backup tape and disk files. Only the operations supervisor and computer center manager should know the location.

Terminations, especially when the employee is not leaving willingly, have to be handled with care. The former employee should be physically escorted out of the building with instructions to never return. There have been cases where a disgruntled employee has ruined necessary data files or a computer system before leaving.

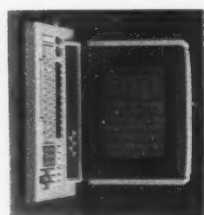
Designing security procedures for a computer operation is not a tough job. If handled right, the procedures will be easy to incorporate in the daily routine.

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We turned this ad sideways so you can see just how large a full-size image on our 132-column display really is.

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But the only way to see what we're talking about is to call for a demonstration. You'll agree that our 132-column displays are clearly better.



Dutch DP Center Finds Packages Ensure Smooth Operations

By Don Leavitt
CW Staff

APELDDOORN, The Netherlands — As Holland's sixth largest insurance company, Central Beheer furnishes a wide range of insurance and pension programs to its member firms.

To support that activity, the company's Central Electronic Administration (CEA) — its DP operation — provides users with an integrated information system including applications ranging from financial planning to payroll accounting, inventory control and sales invoicing.

CEA routinely enhances, maintains and runs more than 4,000 programs on its IteI Corp. AS/4 and IBM 370/158 mainframes. But the "care and feeding" of the programs wasn't always as easy as it is now, according to Herman Weegenaar, Central Beheer's systems programming manager. A number of software packages have helped considerably.

"Four years ago, we were still in a batch and card environment for all phases of program development — writing, testing, syntax checking and maintenance. Turnaround time was relatively long, and testing, for example, would take a day or more," the manager recalled.

The company was using OS/VS1 and, if it was to stick with IBM software, would have to use the Conversational Remote Job Entry (CRJE) for on-line testing and maintenance.

The Time Sharing Option (TSO) was out of the question because it required VS2.

But CRJE didn't seem like a good choice. "First, it would have been necessary to use teletypewriters rather than CRT terminals. In our open-office environs, noise would have been a serious drawback," Weegenaar said. He considered putting the equipment in a remote area, but such a move would have inconvenienced the programmers.

A second problem was cost. The slow speed of the teletypewriters, the cost of CRJE and the overall impact on the CPU load would have eliminated any cost sav-

ings. Beyond that, Weegenaar saw that his people would have had to develop, at additional cost, an interface to a source program library management package — The Librarian from Applied Data Research, Inc. (ADR) — which was already in place.

Passing The Test

In looking for alternatives, CEA installed Roscoe, ADR's remote programming support and data entry package, on a trial basis. It passed the test. "In the succeeding years, we've become enthusiastic supporters. It gave us the flexibility and versatility we had

(Continued on Page 28)

BCS Backs Financial Managers

MORRISTOWN, N.J. — Boeing Computer Services Co. (BCS) has announced major extensions to the support it previously provided financial and planning managers under its Mainstream time-sharing services.

The Executive Information Service (EIS), announced two years ago, is the backbone of the newly established BCS Financial Management Services line. EIS is a system for integrating budgeting, planning, tracking and financial control functions, a spokesman explained.

To that basic system, the company has added access to four BCS-developed prod-

ucts for corporate cash control, currency conversion, time series analysis and extraction of data from existing application records in addition to another seven products developed by other firms but now licensed to BCS.

The Cash Control System not only allows a corporation to reconcile a bank's position on a daily or monthly basis, but to manage and analyze fund levels, the spokesman said. The Currency Conversion System provides analyses of exchange rate information for 30 currencies, he added.

The BCS Economic Series consists of approximately 700 commonly used economic time series in a data base, while the Extract Convert and Load (EXCL) facility enables users to prepare existing data for EIS.

Licensed Products

The licensed products include the Planning and Analysis for Uncertain Situations (Paus) risk analysis package from Bonner & Moore Software System and the Tell-a-Graf and Disspla graphics software from Integrated Software Systems Corp (Issco).

The SPSS statistical analysis program and its conversational version, SCSS, from SPSS, Inc. are also available now through BCS. The Citibase data base, which includes more than 3,500 time series of various economic and industrial indices, indicators, and production and consumption factors, is available as well, BCS reported.

Cuffs, which will be available on Mainstream later this year, is a modeling and forecasting system that allows the user to address such things as product line forecasts, mergers and acquisitions and short- and long-term cash requirements, the spokesman continued.

The BCS network and its Mainstream time-sharing service are available nationwide. The company is headquartered at 177 Madison Ave., Morristown, N.J. 07960.

Relational 'DBM-I' Uses Z80s

ANN ARBOR, Mich. — Condor Computer Corp. described its Data Base Manager (DBM-I) software as a relational data base management system (DBMS) that runs on any Z80-based microcomputer. It is, according to one spokesman, the first DBMS for distributed DP hardware.

DBM-I allows the user to establish a data base and application programs "by merely typing a format into the CRT screen. The system will help define all the fields into which data is entered."

The package "takes care of technical things that used to require a programmer," the spokesman said, adding that these include file creation, the setting up of disk directories and disk layouts.

Relational data modelers have usually emphasized the support their systems provide in accessing the data once it is stored, and Condor follows that pattern. DBM-I supports a very complete inquiry language that allows the user to ask questions in English; a program change is no longer required every time new information is sought, the company said.

The spokesman also claimed that every piece of data stored in the data base can be accessed and analyzed in relation to any other data. Impromptu reports can be generated "almost instantly."

Support for Business Activity

To support the business activities of users directly, Condor has a number of accounting application packages that run under DBM-I. These include general ledger, accounts payable and receivable, payroll, inventory and sales tracking.

A portfolio management system for investment counselors and a financial investment analysis system are also available.

Although the company said DBM-I works on any Z80 microcomputer, it is available only from Condor as a hardware/software turnkey system based on equipment from Cromemco, Inc. The typical Condor 7800 system, including 64K bytes of memory, quad diskette drive, line printer and DBM-I software, costs \$30,000.

Condor is at 3989 Research Drive, P.O. Box 8318, Ann Arbor, Mich. 48104.

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PRODUCTS FOR PERFORMANCE

Global Businesses Tracked

WILTON, Conn. — U.S. Treasury Regulation 1.861-8, used for the determination of foreign source taxable income and U.S. tax credits, is both a blessing and a curse, but National CSS, Inc. (NCSS) has a support service to help U.S. corporations see the good side of the rule, according to an NCSS spokesman.

Developed in conjunction with Touche Ross & Co. and Financial Decision Systems, Inc., the 861Tax product is an interactive, English language system intended to help tax professionals optimize foreign tax credits without the help of the company's DP staff.

That's not easy, the spokesman explained. The regulation provides specific rules and restrictions with which one can determine what is foreign source taxable income, but many of these elements are vague and subject to individual interpretation.

Alternatives Considered

The 861Tax support enables the user to perform the computations for each alternative under consideration. Used in conjunction with business and professional judgment, 861Tax can take a company's financial information, run it through the complex logic cal-

culations and provide detailed printouts of results.

If the results are unacceptable, the system allows assumptions to be changed and credits to be recalculated repeatedly until optimal results are obtained, the spokesman said.

The NCSS support can interface directly with the user's general ledger system and store both current and histori-

cal tax data according to the company's specified classifications, he continued.

Although some effort is required to collect and enter data in an 861Tax-compatible format, the cost of the service thereafter is based on the network resources used.

NCSS is located at 187 Danbury Road, Wilton, Conn. 06897.

Packages Ease Operations at Dutch Center

(Continued from Page 27) hoped for," the manager reported.

He explained that CEA avoided the cost of developing the interface because Roscoe already included linkage to The Librarian. Further, "the cost saving in the first year plus the reduction in CPU load, compared with either our card environment or the CRJE alternative, justified the cost of Roscoe."

Roscoe-equipped CRTs solved the no're problem and allowed the company to install terminals right in the programming area, where each unit is shared by four or five people. "We now have about 40 programmers working with 10 terminals.

"Roscoe takes about 30 minutes of CPU time every 24 hours. After looking at other on-line systems, we feel this is only about 10% of the CPU load we would otherwise have had," he continued.

Turnaround time for testing was cut from more than a day to three hours or less. Programmers now make several tests a day, whereas in the past they were generally limited to one.

For small maintenance changes or program corrections, CEA set up a special high-priority partition, and those changes go through in 10 to 20 minutes, according to Weegenaar.

"We still use coding sheets and 'keypunch' a program the

first time it is created — not on cards, but on a key-to-disk data entry system. Then the program is loaded into The Librarian master file in batch mode.

"From that point on, all work is done through Roscoe-equipped CRTs, and programs are brought into the programmer's own Roscoe library. Thus the programmer is able to use on-line, interactive methods for all the syntax checking, testing and subsequent corrections, as well as for writing JCL," he continued.

To maximize Roscoe's use and to maintain programmer morale, we set up a direct link between the development staff and the person in operations

who maintains the Roscoe procedure library," Weegenaar said.

Other ADR products are in use at CEA. Look, for instance, is being used by systems programmers for tuning work.

Look's big advantage, according to the manager, is that it gives performance measurements applicable across vendor lines. "That was of great help when we began planning to replace our 370/145 with the Intel AS/4," he added.

ADR's Autoflow II documentation package has helped CEA, especially in cases when it has obtained applications programs from outside sources.

THE IBM 303X REPORT CARD

Planning a new 303X installation or expanding an existing one? Want to know what to expect? What should you prepare for? Then find out how well the IBM 303X series has performed in the field to date....

Advanced Computer Techniques Corporation has conducted a multi-client survey that examines the RAS (Reliability/Availability/Serviceability) features and facilities of systems ranging from IBM large scale computers to Digital's VAX series maxis.

Special attention has been paid to a distillation of the availability experiences of IBM 303X users nationwide. With clearly tabulated data, the ACT Technology Analysis Group report reveals such 303X performance traits as:

- Mean-Time between failure (MTBF)
- Availability and availability percentiles
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The fact-filled RAS Survey and study of commercial DP systems has just been completed and is available now. So find out what "grades" the IBM 303X has earned.

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☐ I'd like to order the special *Industry Measures* report on IBM's 4300, at \$150. (which will be credited towards the annual subscription rate of \$350, if I decide to subscribe).

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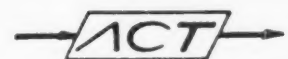
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'Wordpower' Enhancements Boost Text Work on S/34

OAK BROOK, Ill. — Version 4 of the Wordpower word processing support package for IBM's System/34 offers many text editing capabilities which speed and simplify document preparation, according to the vendor, Professional Computer Resources, Inc.

Standard editing features include insertion and deletion of words, lines or paragraphs. Automatic headings, footings, dating and page numbering are easily generated to improve the appearance of the finished document, a spokesman claimed.

Global search-and-replace facilities enable the operator to replace or change a word or phrase each time it appears in a document. Repagination of the finished text is handled automatically whenever revisions make such changes necessary, he said.

Wordpower also allows interactive creation of mailing lists from the user's

existing DP files. Personalized letters are produced by merging name and address information with a standard letter text; accompanying labels — in multiple copies, if required — can also be printed, he added.

Alphabetical and Zip Code sorting capabilities are standard features of the package, the spokesman emphasized.

While printing can be directed to either a line or a character printer with Wordpower's standard support, an optional feature allows interfacing with IBM's 6670 laser-based printer or with the computer maker's Office System 6.

Wordpower costs \$1,800, its vendor said from 2021 Midwest Road, Oak Brook, Ill. 60521.

'Panvalet' Gains Editing Support

OAK BROOK, Ill. — Release 2.1 of Panvalet/On-Line, the on-line program management and security system from Panosophic Systems, Inc., provides IBM 360 and 370 shops with additional editing support.

The GET command retrieves data from library members under edit members in the same or different Panvalet libraries. It is used to copy data into the members under edit and includes user-specified renumbering of retrieved data, a spokesman said.

The SUBMIT command enables a user to set up batch work in conjunction with the on-line editing. It

lets the user submit JCL to a batch partition along with up to five members from the Panvalet library, and it permits the inclusion or exclusion of changes made during the edit run, the spokesman said.

To get exactly the work he wants done, the user can submit supersets or subsets, expand embedded INCLUDE statements and either flush or retain the edit changes once their impact has been demonstrated.

Utilizing IBM's CICS as a teleprocessing monitor, Panvalet/On-Line costs \$5,000 for DOS installations, \$7,500 for OS shops. Panosophic Systems is at 709 Enterprise Drive, Oak Brook, Ill. 60521.

TRS-80 Users Gain Packages

ORANGE, Calif. — Racet Computes has introduced two packages it described as professional programming tools for the Radio Shack TRS-80 microcomputer.

The Infinite Basic package, for example, enhances TRS Basic with support for 70 "nontrivial" commands, according to a spokesman. Any combination of these added Basic commands can be packaged and loaded into any selected memory location to minimize storage utilization, he said.

Most of the enhancements can be classed as either matrix or string functions. These can be coupled with the Racet machine language sorts for multivariable, multikey and string operations — which are part of the package — to provide capabilities not available in other microcomputers, the spokesman asserted.

The Infinite Business package is a separately priced extension of Infinite Basic that supports the creation of solid business application programs, he continued. Infinite Business includes multiple precision packed decimal arithmetic, which will eliminate round-off errors with 127-digit maximum accuracy, he claimed.

Infinite Basic is available for \$49.95 while Infinite Business costs \$29.95. A list of participating dealers or more information about the products is available from Racet Computes at 702 Palmdale, Orange, Calif. 92665.



'Interesting — But I Doubt Video Thumb-Twiddling Will Ever Replace "Star Wars."'

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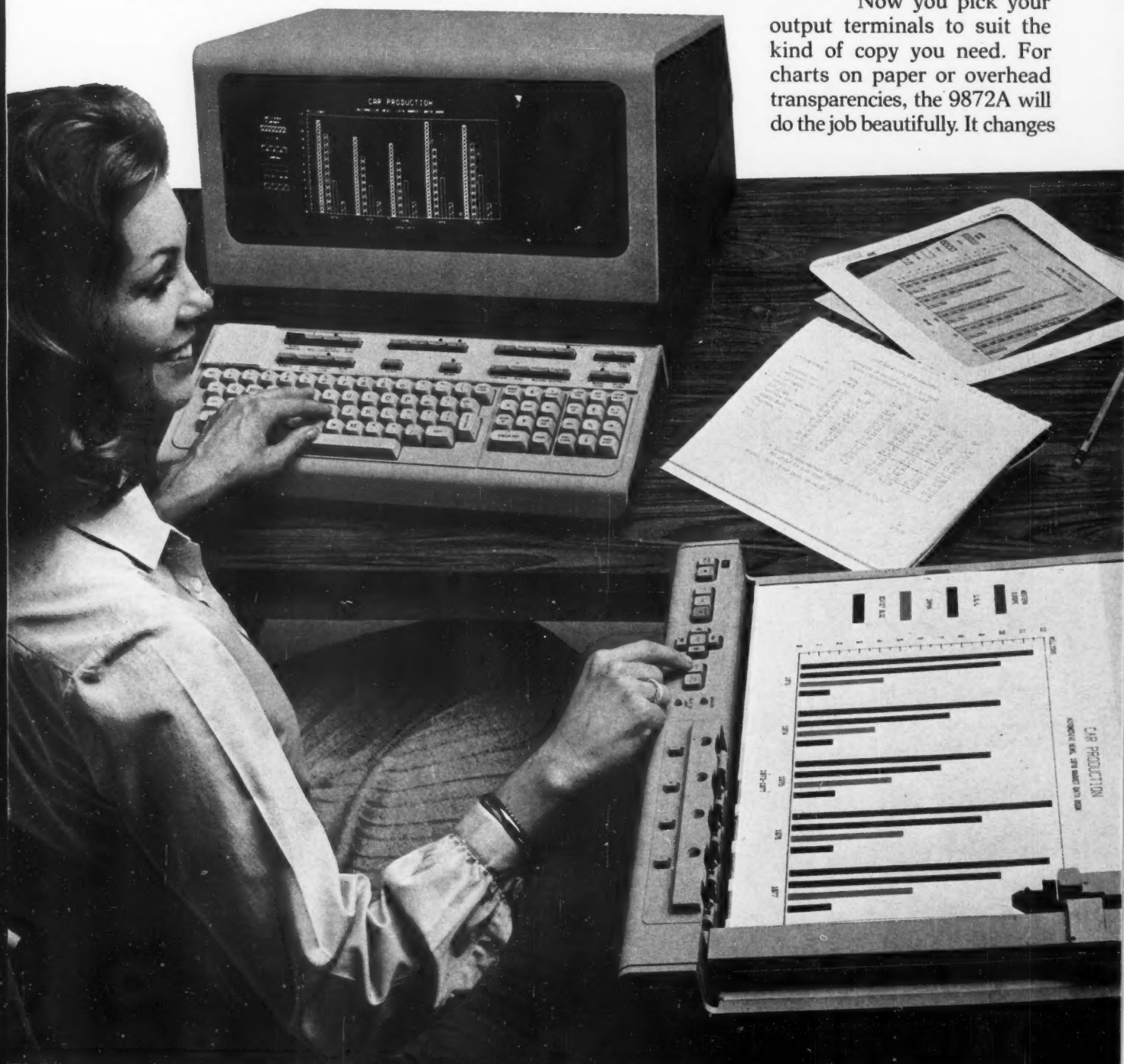
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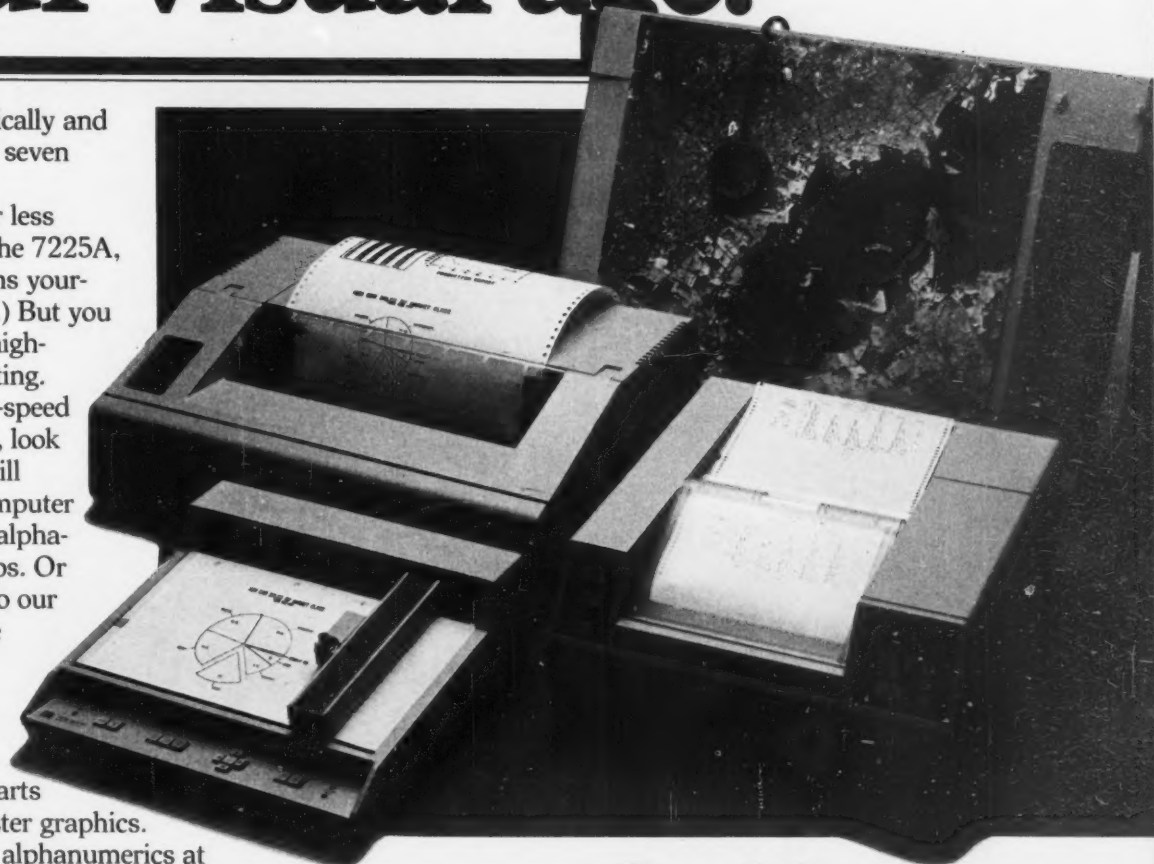
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UK Firm Cuts Development Costs

By W.H.A. Starks

Special to CW

LONDON — How does a major industrial corporation face today's challenge of meeting the growing demand for computer application systems in an environment of increasing business complexity and escalating manpower costs?

For Shell UK Ltd., one approach was to look at the computer technology itself by automating some of the development process. Shell UK is an operating company of the Royal Dutch/Shell Group. Its activities are integrated and are comprised of oil exploration production and the refining and market-

ing of a wide range of petroleum and chemical products.

With rising cost, the Information and Computer Services Staff at Shell has for several years been interested in the feasibility of systems generation techniques, especially those that might automate much of the labor-intensive portion of system development and implementation. After a period of intensive evaluation of known packages, Shell finally settled on Genasys, the system development generators offered by Generation Sciences International (formerly Genasys Systems, Inc.) of San Francisco.

In the early stages of negotiation, vendor management suggested a six-month trial period in which Genasys would be installed on an IBM 370/158 at Shell. Two medium-size applications were to be developed in order to provide a "live" evaluation of the generator approach.

Successful Trial

The trial proved a considerable success, exceeding the performance expectations originally established. Shell UK concluded that typical elapsed times for development can be reduced by 50% and actual manpower costs are typically reduced by up to 30%.

Beyond that, computer usage in development increased 80% and the generated programs provide processing performance at least as good as conventionally developed programs.

The Genasys methodology centers on the production of a design manual from user-supplied specifications. The design manual cycle is typically an interactive process in which the design is continually refined until it meets final user acceptance.

At Shell, we found that this process encourages a high level of user participation in the critical definition and design phase. When the design has been approved, program generation is effected by a parameter change and introduction of programmer-supplied coding.

This coding typically amounts to 20% of total code in the system and represents the application-specific segment of the final solution. Furthermore, the generated programs, because of their consistent structure, require fewer turnarounds to achieve execution.

On the basis of the successful trial, Shell UK acquired Genasys in late 1978.

Starks is head of the London Systems Group, Shell UK Information and Computing Services.

Dialog Data Base Offering SEC Financial Abstracts

PALO ALTO, Calif. — Abstracts of current financial reports from American businesses are now accessible through Lockheed Information Systems' Dialog computerized information retrieval service.

Developed by Washington, D.C.-based Disclosure, Inc., the data base summarizes reports filed annually with the Securities and Exchange Commission (SEC) by some 11,000 public companies.

The Disclosure data base abstracts more than 100,000 reports, including — among others — the 10K annual business and financial report; the 10Q quarterly financial report; prospectuses; and the 8K report of unscheduled material events or corporate changes of importance to shareholders or to the SEC.

The data base is updated weekly and can be searched for information by name of company, stock exchange or Standard Industrial Code. A list of pertinent reports is displayed on the user's CRT terminal screen, and microfiche copies of the full report can then be ordered from Disclosure, Inc., 4827 Rugby Ave., Washington, D.C. 20014.

Information about accessing the data base and about other Dialog facilities is available from Lockheed Information Systems, 3251 Hanover St., Palo Alto, Calif. 94304.

Update Eases Job Accounting

TOIVOLA, Mich. — The job accounting system introduced earlier this year by Engineering Systems Research Co. (ESR) for Digital Equipment Corp. PDP-11s has been updated to include support for Version 3.0 of DEC's IAS and to make the system more flexible for the user.

A SHOW USAGE command, for example, can be entered at any time to allow verification of accounting values accumulated at any terminal or batch entry station, a spokesman said.

As part of its billing routines, the update now allows the system manager to define time intervals during which specific rates are to be applied. This enables the manager to encourage use during slow periods or discourage it during prime times, he noted.

Output from the accounting run can be directed to any device linked into the system.

The ESR package costs \$2,000 for the first CPU, with discounts offered for multiple units. Source code costs a separate \$2,000.

An optional spooler, said to incorporate special escape control features, is available for \$350.

ESR can be reached through Rt. 1, Box 104, Toivola, Mich. 49965.

Package Backs Libraries On System/3

AMARILLO, Texas — The Library Management System recently introduced by Pro-Documents was written as an aid to maintaining object, source and procedure libraries on an IBM System/3.

The package provides management in the form of various cross-reference reports. These show, for example, relationships between procedures or programs called/loaded by them; relationships between procedures and programs, and files; and conditions that might lead to invalid calls or invalid procedures.

The package is currently structured to support a single procedure library, two source libraries and three libraries for object code.

Since the package is written in RPG-II and source code is distributed, users can change the system to support any number of each type of library, the spokesman said.

The software, expected to be ready soon, will cost \$500, Pro-Documents said from 5100 Live Oak, Amarillo, Texas 79110.

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School Days

Two More ISPs Added by IBM

WHITE PLAINS, N.Y. — IBM has introduced two more Independent Study Programs (ISP) courses, supporting two distinct parts of the software development cycle.

One, called "The Application Development Process: Project Reviews," includes a workbook divided into five modules, each devoted to one step in the review process. The course takes six to nine hours, depending on student experience, a spokeswoman said.

Cataloged as ISP I-0070, it costs \$95.

The second course, "Managing Application Conversion Projects," also has a workbook with five modules. Described as an advanced course, it takes eight to 12 hours.

This course is listed as ISP I-0060 and costs \$150.

ISPs are available from both the Data Processing Division and the General Systems Division of the company.

AMA Schedules Course On Payables Systems

NEW YORK — The American Management Associations (AMA) will present a seminar entitled "Developing Computer-Based Accounts Payable Systems" in three cities this autumn, starting in Chicago next week, on Sept. 17-19.

Intended for both DP technicians and user department personnel, the course will also be given here in New York Oct. 22-24 and in Los Angeles Nov. 26-28.

The registration fee is \$480 for AMA members and \$550 for others. Discounts are available for teams of three or more from the same organization.

AMA is at 135 W. 50 St., New York, N.Y. 10020.

Asis Chicago Chapter Plans Workshop

CHICAGO — The Chicago Area Chapter of the American Society for Information Science (Asis) will hold a workshop on "Integrated Management of Information" Nov. 9-10 at the Blackstone Hotel in downtown Chicago. The integrated use of word processing, data processing, communications and information retrieval techniques will be discussed, and vendors will be on-site.

The workshop fee is \$50 for those attending one day, \$85 for those staying two, according to program chairwoman Karla Peterson.

More information on the workshop is available from Peterson at the Center for Research Libraries, 5721 S. Cottage Grove Ave., Chicago, Ill. 60637.

'RDM' Runs PDP-11 Data Base Work

PORTLAND, Ore. — Interactive Technology, Inc. (ITI) has released the Real-Time Data Base Manager (RDM), which a spokesman described as a data base management system (DBMS) for Digital Equipment Corp.'s PDP-11 family of minicomputers and microcomputers.

Written in Pascal and implemented under RT-11 (with TSX for multi-user software), RSX-11M and RSTS/E envi-

ronments, RDM requires at least an 18K-word partition, with hard disk recommended as secondary storage.

Although the vendor had little more to say about what makes the product a DBMS, the spokesman noted it contains two "significant" utilities, one of which is an extra-cost option.

An integral part of the package, ITI Prompt is an operator-oriented module that

makes both data entry and lookup of previously stored data simpler than it might otherwise be, he said. Using English-like commands, the operator can enter, read, modify or delete data.

The interactive report generator, called ITI Inquire, provides the user with special formatting capabilities such as report titling; page and column headings; page numbering; data sorting by user-

defined categories; and accumulation and printing of subtotals, totals and averages.

Available on magnetic tape or cartridge disk, RDM costs \$8,995 for RT-11 users, \$10,495 for RSTS/E users and \$11,500 for RSX-11M users. The ITI Inquire report generator costs an extra \$995, \$1,495 and \$1,995, respectively.

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Careful 'Treatment' Urged Data Base Operations Hit by Epidemic of Ills

By Stephen L. Robinson
Special to CW

When a doctor notices an unusually high percentage of his patients suffering from the same malady, he might assume an epidemic is under way. If conversations with other doctors indicate a similar increase in cases of the same malady, the general consensus would be that an epidemic is indeed underway.

When a consultant, through interchange with his colleagues, discovers they all are

being summoned to investigate similar problems, the inescapable conclusion is that a data processing epidemic is under way. Such is the case now.

Data Base Corner

So you can avoid becoming a victim, I would like to share the symptoms of the epidemic with you.

In past columns, I have dwelled on the absurdity of utilizing a data base package

to recreate old, file-oriented, second- (or first-) generation systems. Such undertakings are typically fostered by a "hurry up and get something running under data base" attitude of management. READ and WRITE statements in old application programs are replaced by CALL statements to the data base package and everyone is happy — until management wants information which crosses file boundaries or until management notices that the new data base version of the old system actually requires more computer resources than the old system.

This is when everyone gets their resumes in shape for the forthcoming purge. In the future, taking their inspiration from President Carter, perhaps the DP people will be asked to submit their resignations for management's consideration.

The purge is usually inevitable, unless management can be convinced the data base package was at fault. In that case, a stay of execution will occur, giving the DP people longer to get their resumes in shape before the next blood bath.

All that occurs primarily because of internal bungling of the concept of a data base system. But what of those organizations where system and programming expertise is typically acquired from the outside?

Surely such shops are better off in making the transition to data base. The outside designers are sure to understand the intricacies of data base. The resulting systems will surely reflect the latest thinking in effective transaction-oriented system design. The utilization of the data base will surely reflect an understanding of all the subtleties of the software.

Wrong, on all points. In the last year or so, I have seen such "data base systems" as:

A manufacturing system which could easily have all disk files changed to tape files, without changing the logic of any application programs.

Actually, the whole system would run quite satisfactorily on electronic accounting machine (EAM) equipment. Since this shop had quite a bit of such equipment in an old storeroom, perhaps the design was to facilitate manual and EAM backup.

A payroll/personnel system of modest size (4000 employees) which required several hours per update run.

This "data base system" was clearly an old IBM 1401 system. When "confronted" with this observation, the designers admitted they have been using the same general system flowcharts for the last 12 years.

A manufacturing system that required almost triple the computer resources of its predecessor. The system design looked like the designers had deliberately set out to violate every design rule of the data base package being employed.

The list could be extended to fill this week's *Computerworld*. What all of these systems have in common is that they were not designed in-house; they were designed and, with one exception, programmed by outside firms.

Rx for an Epidemic

What does all this mean for the average DP shop that employs outside designers and programmers if it is considering "going data base"?

Primarily, it means management will have to be more careful than ever in the selection of outside assistance.

Ask to see the system flowcharts of previous "data base systems" designed by the organization. It really doesn't matter if the systems are in your application area or not, although the latter is clearly desirable.

Are there many spinoff files used solely as input to another run? Are there many sort and print runs? Does a file have to be passed to be updated? Could all the tentative disk files be replaced by tape files (or card decks) without necessitating application logic changes?

If the answers to some or all of the above questions are "yes" you are probably headed for trouble — unless you really don't want a data base system.

Ask for references of systems the outside vendor has designed which employ your data base package. Acquire

copies of file designs for one or more of these systems. Have the package vendor, or an independent consultant in file design for the package, examine the file structures in the acquired systems.

Do the file and record structures reflect an understanding of the package efficiencies? Do the access and indexing techniques indicate the designer understands the trade-offs inherent in the system? Are the "system parameters" (blocking factors, buffer sizes, other installation options) appropriate for the system?

Too many "no" answers to those questions indicate you are heading for trouble.

Finally, if an outside organization is going to do the coding, conduct a similar investigation of its past coding efforts using your data base package. If an independent (or vendor) review of the coding reveals major deficiencies in the use of the packages coding facilities, you are again a possible victim of the plague.

Balancing the Scales

I realize the tone of this column is quite negative. Let me balance the scales a bit by pointing out that many new (as well as old) consulting firms provide excellent assistance in data base system design and implementation.

The future is even rosier. The normal tendencies of individuals to try their wings and form their own companies should improve the overall situation. Many such companies are spinoffs from data base package vendors.

Robinson is an independent consultant operating as S.L. Robinson & Associates, based in Morrisville, Pa.

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Mergers, Acquisitions Analyzed by 'Xforma'

WALTHAM, Mass. — Xforma, a financial modeling system for corporate planning recently installed on the Interactive Data Corp. remote computing network, is said to have unique capabilities for analyzing mergers and acquisitions.

Designed to produce quick and easy pro forma forecasts and consolidations, the system enables analysts to project the financial performance of acquisition candidates and to determine how a merger will affect both parties involved, a spokesman said.

Working at a timesharing terminal, an analyst with Xforma can produce a forecast on any company in Standard & Poor's Compustat or the

Value Line data bases, according to historical relationships or other assumptions.

Private data may also be entered for companies that are not publicly traded, the spokesman noted. The system generates a variety of reports including balance sheet, income statement, ratio and flow-of-funds reports.

Simulations with Xforma allow use of default forecast assumptions, modification of assumptions and input of important merger data such as unfunded pension liabilities, intercompany sales and acquisition financing.

Interactive Data's nationwide network is headquartered at 486 Totten Pond Road, Waltham, Mass. 02154.

Instead of Number-Crunchers Switch to Packet Net Predicted for DOE

Special to CW
VIENNA, Va. — Within five years, U.S. Department of Energy (DOE) scientists, engineers and policy analysts will be using a commercial packet-switching network and sophisticated computer tools to tackle the nation's energy problems.

That is the prediction of Dr. James Pool, head of the DOE's Applied Mathematical Sciences Program within the Office of Energy Research. Pool's group is responsible for the basic research essential to developing such tools.

"We're looking at systems past the [Cray Research, Inc.] Cray-1 and [Control Data Corp.] Star," Pool explained. Those systems are currently among the world's fastest commercially available number-crunchers.

Moreover, DOE is exploring the potential for resource-sharing and computer-assisted communications systems, early versions of which are already commercially available on Telenet Communications Corp.'s nation-

wide packet-switching network.

This exploration dates back to 1973, when Pool's group was part of the Energy Research and Development Administration (Erda), which the DOE absorbed in 1977.

Resource-Sharing Program

Originally, the group was an ad hoc working committee charged with determining how Erda might use then-emerging networking technologies (the De-

fense Department's Arpanet and, later on, Telenet) to make better use of computer resources. The group recognized that scientists in various national laboratories were duplicating each other's efforts, while researchers at other sites lacked access to important computational and data management facilities.

Prior to the program's inauguration, most scientists, engineers and policy analysts — especially those in noncomputer-oriented

disciplines — relied strictly on traditional means of communicating with one another: the telephone, memoranda and conferences.

The DOE resource-sharing program applied alternative means of communication with results that were "immediate and spectacular," according to a 1977 progress report.

"It's really exciting," Pool said. "People are working together" (Continued on Page 36)

To Cut Phone Line Costs

DCA Adds Multipoint Multiplexing

NORCROSS, Ga. — A multipoint multiplexing configuration that allows Digital Communications Associates, Inc. (DCA) statistical multiplexers to be multiplexed from a single trunk link is available from the vendor.

The configuration is said to yield substantial savings in telephone line costs for large networks and to be especially suit-

able for networks or branches of networks that have many remote sites with small numbers of terminals at each site.

A variation of the master/slave concept, DCA's multipoint multiplexing reportedly involves use of the DCA System 150 master network processor to control polled slave units. The slaves can be either DCA System 105 or 115

statistical multiplexers or a combination of both.

The System 150 sends traffic from host CPUs to each polled slave using an addressing scheme. Concurrently, the System 150 master unit selects one of the polled slaves to transmit traffic inbound to hosts (see box on Page 36).

According to a DCA spokesman, all users in this type of network have the following facilities as part of DCA's Integrated Network Architecture: host selection or permanently connected lines; host/port contention; choice of fixed transmission speeds, or (Continued on Page 36)

SNA Diagnostics Improved: Doll

ANN ARBOR, Mich. — The latest IBM enhancements to its Systems Network Architecture (SNA) have increased operating flexibility in several key areas, according to Dr. Dixon Doll, president of the DMW Group in Ann Arbor, Mich.

Doll said the recently announced Network Problem Determination Application (NPDA) program rids SNA of a major shortcoming: its lack of effective network diagnostics and error detection features.

Operating in conjunction with other SNA software, NPDA collects network error data and stores it in a data base of network problem statistics. When used with the latest IBM modems, NPDA can isolate errors in the

line, modem, modem interface or terminal controller, Doll explained.

"These announcements indicate IBM is beginning to pay attention to network error diagnostics within SNA for the first time," Doll said. "While the IBM capabilities still have a long way to go before they approach the features incorporated by users into customized technical control centers, they nevertheless indicate the vendor is aware of user requirements in this area."

Another significant improvement in the transmission network environment is the addition of alternate routing capabilities. Here IBM has introduced the ability to define alternate data routines at the time the network

is configured by the user.

If one of these paths should fail during network operation, an al-

(Continued on Page 36)

HP 3000 Gets Front End

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a front-end communications processor for its HP 3000 Series III, 33 and 30 minicomputers.

Coming with an HP sapphire-on-silicon microprocessor and 32K bytes of random-access memory, the Intelligent Network Processor (INP) offloads the communications management task from the host CPU, according to a spokesman.

The INP reduces overhead, relieves CPU congestion and allows communications over modems and via V.35 and leased lines at speeds as high as 56K bit/sec, he added.

The HP 300010A INP for the Series III mini family and the HP 300020A for the Series 33 and Series 30 families cost \$4,500. HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

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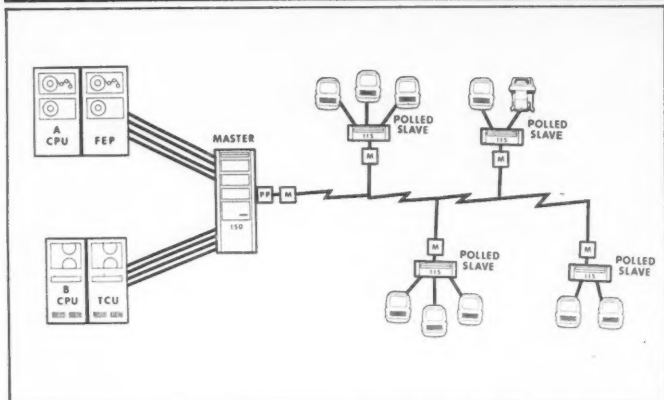
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~multiplexers~



In DCA's multipoint multiplexing configuration, the System 150 selects polled slaves to transmit data from terminal to hosts.

Multiplexers Multidropped

(Continued from Page 35)

"autobaud" selectivity; choice of modem/signal protocols; and "error-controlled" trunk links.

All DCA statistical multiplexers and network processors are mutually compatible, the spokesman noted.

The cost of the configuration varies from user to user, but DCA cited the costs incurred by one customer the vendor considers representative.

That user employs three multidropped lines off a single System 150. One line goes to four System 105 multiplexers, a second line joins four System 115 multiplexers and the third line connects two 105s and a single 115. The total cost of this particular configuration was \$53,500, according to the spokesman.

The user would probably have spent only \$47,900 if the configuration was point-to-point rather than multipoint, he estimated. The user reportedly spends \$700 each month on Bell 201Z modems; in a point-to-point arrangement, that cost would be \$660/mo assuming a monthly lease payment of \$30 per modem.

However, the multidrop configuration has trimmed telephone communications costs to \$2,300/mo from an estimated cost of at least \$3,320/mo if the configuration was point-to-point. The customer is therefore saving about \$900/mo on telephone and modem costs combined.

DCA is at 135 Technology Park, Norcross, Ga. 30092.

DOE to Rely On Packet Net

(Continued from Page 35)

who otherwise wouldn't have. Often, they have never met each other; yet they exchange information routinely via computer-assisted communications systems."

Conferencing System

One of the most actively used systems at present is the Planet-2 computer conferencing system offered on Telenet by Infomedia, Inc. Over a typical three month period last year, the system was used by 129 scientists, engineers and administrators. About half of them participated in a single conference, while the other half engaged in two to 18 separate activities.

During this period, usage costs — independent of computer leases — were less than \$14 per user per month.

Today, more than 200 scientists, engineers and policy analysts in DOE academic and private research centers scattered across the nation are communicating with each other on a daily and sometimes hourly basis via Planet-2.

Pool is coordinating conferences of researchers who collaborate on such projects as:

- A study of data base management problems associated with the department's contingency gas rationing plan.
- A DOE-funded data validation project that is assessing methods for collecting data at a number of U.S. sites.
- An effort by computer scientists at academic, private sector and DOE research centers to systematize tools for developing numerical analysis software in Fortran.

The improved communications is credited with accelerating a trend towards effective, widespread resource sharing in the research community.

Often, the impetus to share resources arises spontaneously during a teleconference and not from a management mandate. Collaborators seem naturally drawn to the most direct approach to solving a common problem.

For example, researchers at one site noticed during a teleconference that their colleagues at a different site had complementary software. Rather than develop the extra software at the former site, the collaborators began processing data at the latter site and then transmitted results through the network as input to a second program.

Access to Unique Gear

A further benefit of this network usage was accessibility of unique hardware systems and data to scientists in very remote locations.

A prime example of this was a project that involved scientists at several sites who had created computer programs to minimize the heating and cooling requirements for given building designs. The problem was that the software required as input a 10-year weather history for the building location — enough data to swamp even the largest storage facility at the participating sites.

However, the scientists located an experimental data storage machine and were successful in demonstrating its feasibility in the building design program. The National Oceanic and Atmospheric Administration is now using the facility to store a national weather history data base.

Further, DOE is using Telenet and Arpanet to draw on experts from outside the basic research area. Physicists, econometricians, geologists and sociologists from anywhere in the U.S. can be "accessed" electronically for help on projects as the needs arise.

SNA Diagnostics Improved

(Continued from Page 35)

ternate can automatically be invoked in the path control layer, Doll said.

This means that the end user and the network operator don't have to get involved. The alternate routing structure resides in each of the network nodes, so an automatic switch-over occurs in the event of a failure in the primary transmission path, he said.

These multiple logical transmission groups also allow users to select separate data paths for interactive or batch data.

Although this alternative routing scheme adds important network control features for the user, it still falls short of providing the dynamic adaptive routing capabilities found in packet-switched public networks, Doll observed.

In effect, SNA users now have two levels of redundancy to provide fail-safe capabilities in the event of malfunctions within network links. By running multiple links in parallel, it is possible to lose portions of the physical links and then use alternate routes. This makes it possible to avoid reconfiguring the primary route, but as a second level of redundancy, alternate transmission paths can also be activated, he said.

These routing improvements are expected to have a beneficial impact, primarily on large Fortune 500 network

users operating in multinational environments, Doll predicted. Users with non-tree-structured nets typically encounter the need for these types of alternate routing capabilities.

Returning to the diagnostic features of the IBM 3863, 3864 and 3865 modems, Doll explained that a remote-site modem can be activated to perform loop-back functions through commands initiated at the central site 3705 front end. These commands are transmitted over the data stream as Synchronous Data Link Control (SDLC) frames with unique command sequences that would not normally be interpreted by the cluster controller.

Users have been able to utilize similar remote diagnostic features for some time with independent modems, but now these capabilities have been included in the latest upgrades to the SNA Network Control Program (NCP), Doll said.

The use of remote diagnostics with independent modems typically necessitates disconnecting the line to be tested from NCP and sending the diagnostic commands to the remote network node from a test set supplied by the independent vendor. Now the user can perform these functions strictly with IBM equipment instead of having to rely on IBM and on modem devices from independent vendors, he stated.

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\$26.2 Million Rebate Killed California Line Charges Unaffected by DP Error

By Jeffry Beeler

CW West Coast Bureau

SAN FRANCISCO — A multi-million-dollar computational error by California's Public Utilities Commission (PUC) in figuring its proposed rate changes for leased data communications lines [CW, Aug. 13] will probably have no effect on those rates.

Paul Popenoe, who heads the rates branch of the PUC's Communications Division, made that statement during a telephone interview here recently. Earlier statements by the PUC had raised at least the possibility that the mistake might necessitate a thorough overhaul of the revised rate structure.

Before the error's discovery, Popenoe had predicted that the restructured rates would increase data communications costs for transmission lines shorter than 10 miles and at the same time cut overhead for lines 10 miles or longer. Overall, he added, the restructuring would boost line charges statewide by about \$1.7 million yearly.

Now, even though the PUC has admitted making a large miscue in one of its rate calculations, Popenoe still reportedly considers the new rate structure just as viable as it was when it was first announced.

Increase Denied

The error in the PUC's computation apparently occurred last July, when Pacific Telephone Co. appealed to the commission for a hike of \$470 million annually in phone service charges. To Pacific Telephone's and almost everyone else's surprise, the PUC rejected the proposed rate increase and instead ordered the firm to cut its charges by \$42.2 million per year.

At the same time, however, the commission also restructured the phone company's data communications rates

to help offset its losses in the voice communications area.

Proposal Rejected

Some PUC officials recommended that a \$26.2 million income tax deduction credited to AT&T, Pacific Telephone's parent firm, be ascribed to the subsidiary and applied to its rate reduction, Popenoe said. If the commission had accepted that proposal, it would have eased Pacific Telephone's tax liability and forced the firm to pass along the resulting savings to its customers.

But after due consideration, the PUC decided against the proposed income tax adjustment and thus killed the pos-

sibility of a \$26.2 million rebate for telephone company customers.

DPers Not Informed

News of the commission's veto, however, evidently never reached the PUC's DP staff members, who mistakenly included the tax adjustment in the data used to compute the phone company's rate cut, Popenoe explained. As a result, the DPers inadvertently decreased Pacific Telephone's tax liability by \$26.2 million and, in so doing, inflated the utility's rate cut by the same amount.

Phone company officials immediately spotted the slipup and notified the commission, which quickly acknowl-

edged its mistake. The PUC then recomputed Pacific Telephone's rate decrease and, with the tax adjustment omitted from the second calculation, derived a final figure of \$16 million, exactly \$26.2 million less than the original \$42.2 million cutback.

Popenoe blames the PUC's computational error on the haste with which the commission was forced to revamp the phone company's complex rate structure. "In getting out the [rate-cutting] order, we had to perform a lot of last-minute calculations, and somewhere along the line a key instruction got lost in transmission" between the commission and its DP staff, he said.

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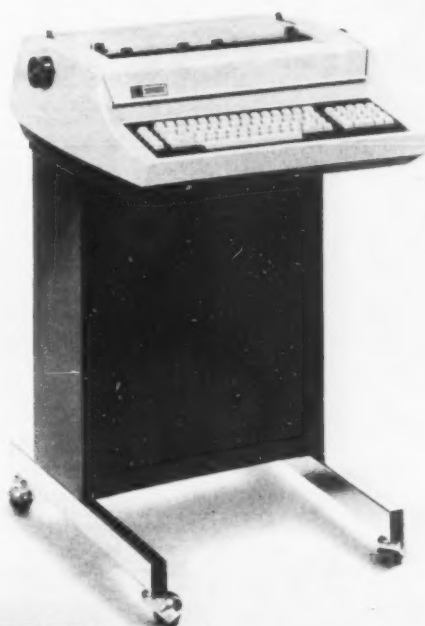
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Controller Ties Nonpolling Unit, Burroughs Net

CINCINNATI — A microprocessor-based controller that interfaces serial or parallel nonpolling terminals to Burroughs Corp. polling networks is available from Midwest Data Source, Inc.

Installing the Model BPI-8 requires only the attachment of signal cables to the network, according to Midwest Data. Communications modes reportedly include synchronous and asynchronous in the 300- to 9,600 bit/sec range.

Single Controller

A single controller can attach up to three devices, including a CRT terminal, printer and tape drive, the vendor stated.

Attachable CRT terminals are said to include the Applied Digital Data Systems, Inc. Regent 40 and Regent 100 and the Hazeltine Corp. Model 1510.

Suitable printers include those from Centronics Data Computer Corp. and Texas Instruments, Inc.

The BPI-8 costs \$1,195, Midwest Data said from 1010 Nimitz Road, Cincinnati, Ohio 45230.

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Sweden Gets Public Data Base Retrieval Service

STOCKHOLM, Sweden — Tymshare, Inc. has completed equipment installation for a public data base retrieval service in Sweden.

Under the auspices of the Swedish postal, telephone and telegraph (PTT) administration, the service will provide access from Sweden to U.S. public packet networks via a Tymnet internetwork gateway node. Tymshare's common carrier subsidiary — Tymnet, Inc. — operates the Tymnet network, considered the U.S.'s largest public

packet network.

"This marks the first time that Swedish data users can have local, dial-up access directly to U.S. computers and data bases," according to a Tymshare official. "And conversely, U.S. computers and terminals will have direct access to Swedish computers and data bases."

Prior to this, Swedish access to computer systems on U.S. packet networks could be established only by making a long distance telephone call

to Amsterdam, the spokesman explained. The network, which reportedly features Western Union International facilities, also allows Swedish users to access CPUs within their own country.

Two 'Engines'

In Stockholm, the Swedish PTT has two Tymnet "engines," or communication processors, that allow gateway

access to the Tymnet and Telenet public packets.

Tymshare has furnished equipment to support dial-up and hard-wired terminals, X.25 protocol hosts and various network management functions.

In the U.S., the Tymnet packet links approximately 250 host computer systems and serves some 180 cities with local call terminal access. Additional coverage is available via Wats lines across the nation.

School Gets Electronic Mail

MADISON, Wis. — "Neither snow nor rain nor heat nor gloom of night stays this computer from the swift completion of its appointed rounds."

That's how the inscription on the New York General Post Office might be updated today as the high-speed circuitry and memory of the computer is made available as an alternative to the traditional postal system.

At the Academic Computing Center at the University of Wisconsin-Madison, the computer as mail carrier is aiding communication within the university and throughout the Midwest.

Users may send each other memos, drafts of working papers and computer program listings or data. Messages of up to 9,999 lines can be sent to a single recipient or a group of recipients.

Average Cost

According to Al Roberts, user services manager at the computing center, the system is easy and convenient to use. "The average cost for an electronic message is \$2 for a quarter to a half page, with group mailings slightly more," he explained.

On-campus coordinators of the electronic mail service for regional use include the Waisman Center and the University of Wisconsin Extension. Carol Overboe of the Waisman Center said the center uses the "mail" system

for computer conferencing as well as daily mail service.

"The system is used to support a network of five information centers, each serving as a clearinghouse on information, materials and resources for developmentally disabled individuals," Overboe noted.

The Academic Computing Center is also the clearinghouse for mail services for Edunet, a national network of college and university computer-based resources. National users of the mail service include the federal Departments of Agriculture and Health, Education and Welfare, although not, for obvious reasons, the U.S. postal system.

Terminal Offers Function Space Of 6,500 Char.

MINNEAPOLIS — A terminal that includes 48 lines of display memory with a 24-line rolling "window" and a 6,500-char. function memory is available from Research, Inc.'s Teleray division.

The Teleray Model 12 stores its function memory for later editing or transmission, effectively expanding its editing work space to 128 lines, or more than five pages, the company said.

The terminal can be used either for interactive applications such as data inquiry or computer-aided instruction or for off-line editing or program development.

The function memory holds up to 32 programmable functions, including text forms and control sequences. The functions are loadable from either the keyboard or host computer. The terminal offers a full range of editing facilities, Teleray said.

The Model 12 can be programmed to display 40 double-sized characters per line, and its I/O ports are independently programmable. The cost is \$1,690. Teleray can be reached through Box 24064, Minneapolis, Minn. 55424.

Correction

In the Special Report entitled "The Move to Distributed Processing" [CW, July 30], the artwork accompanying "DDP Viable for Airline Maintenance Operation" by Keun Lee was labeled incorrectly. Figure 2 carried the title intended for Figure 3 and vice versa.

Moreover, in both Figure 2 and Figure 3, the top set of brackets should have been labeled 'I' and the bottom set of brackets 'II'; the two functions mentioned at the bottom of the article's first column should have referenced I and II, respectively.



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General-Purpose Terminal Introduced by NCR Corp.

DAYTON, Ohio — NCR Corp. has announced a microprocessor-based general-purpose terminal that can be used as a free-standing system or linked on-line to a host mainframe.

The NCR 2950 can be programmed by the user to handle a variety of information processing tasks. It is said to provide extensive cash control, auditing and security features.

All of the keyboard's 105 keys are programmable. The keyboard can provide more than 300 functions, symbols or preset constant values.

Twenty-seven keys are user-programmable with NCR Basic language to provide 108 special functions or procedures. A 12-in. buffered CRT is included.

Available peripherals include compact matrix printers for journal, receipt and inserted form printing; a digital cassette recorder for data and program storage; automation reading devices for information printed with the optical character recognition (OCR) font; cash drawers; and communications between the terminal and mainframe.

Two Applications

Two applications are being offered with the terminal: a remittance control system and a nursing station system.

As a nursing station terminal, the terminal operates as part of NCR's Medical Information and Communications

System (Medics). Information about a patient can be entered at any terminal.

The system automatically routes it to the proper file and, if required, to another of the terminals in the hospital linked to a host mainframe.

Ready in Last Quarter

NCR expects the 2950 to be used as a general-purpose, back-office processing system, a spokesman indicated. Initial versions of the unit will be available in the fourth quarter.

The terminal will include 60K bytes of memory, the Basic interpreter, optional cassette, three types of printers, cash drawers, communications compatibility with NCR retail systems and the remittance control application.

With two printers, cassette unit and software, the NCR 2950 costs about \$7,000; it can be rented for \$300/mo. A one-time license fee of \$785 buys the NCR Basic interpreter, utilities and program development tools.

For the remittance control system, which includes Basic interpreter and utilities, the license fee is \$735 or \$18/mo.

The nursing station application will be available in the first quarter of 1980.

A flexible disk storage unit, OCR readers and industry-standard asynchronous and bisynchronous communications will be available as options in 1980, NCR said.

POS Terminal Handles 300 Types of Transactions

MONTGOMERYVILLE, Pa. — A point-of-sale (POS) terminal that reportedly can handle nearly 300 transaction types is available from Transaction Management, Inc.

The Model 1021 Retail Transactor captures all transaction data on a magnetic tape cartridge in a format ready for direct computer entry and simultaneously generates a customer receipt and paper tape journal, a spokesman said.

The microprocessed system comes with a 32K-byte read-only memory and up to 2K bytes of programmable main memory. Data is captured on a 3M Co. DC100A data cartridge by an integral tape drive, he added.

Communications proceed at switch-selectable rates in the 130- to 9,600 bit/sec range through an RS-232C interface in Ascii transmission format.

Terminal Features

Based on Transaction Management's Model 1011, which has been in use for two years, the Model 1021 features fractional quantities expression, slip validation, independently operated tax tapes, manual tax override, percentage and dollar amount discounts and multiple tendering.

The color-coded keyboard has five mode keys, 10 function keys and a 12-key numeric pad.

Available options include a cash drawer, customer display, separate slip printer, logo printer, magnetic stripe credit card reader and input for an optical character recognition wand scan-

ner.

The Model 1021 costs \$2,395. A "typical" selection of options for retail use would bring that price to about \$3,000, the vendor observed, noting that quantity discounts are offered.

Transaction Management is located at 1050 Rt. 309, Montgomeryville, Pa. 18936.

Option Hikes Decwriter Speed

CHARLOTTE, N.C. — Digital Equipment Corp. LA36 Decwriter users can upgrade the printer's APL print speed from 30- to 165 char./sec with an option for Datasouth Computer Corp.'s DS120 terminal controller.

The option allows selection between APL and the standard Ascii character set through a control code entered from the keyboard or via the data stream.

It is stored in an additional read-only memory, the company said.

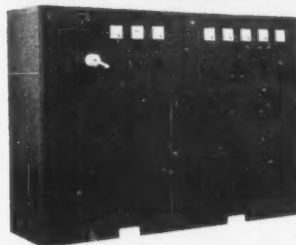
Characters can be underlined at the same time they are printed, increasing throughput by effectively printing two received characters at once, according to Datasouth. The DS120 itself provides 165 char./sec bidirectional Ascii printing and a variety of 1,200 bit/sec capabilities.

The APL option can be added in the field or in the factory. It costs \$125, Datasouth said from 627 Minuet Lane Charlotte, N.C. 28210.

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Multipurpose Simulator/Tester Built for X.25

TUSTIN, Calif. — A multipurpose X.25 protocol simulator/tester is available from Applied Data Communications.

The unit is aimed at users of the CCITT X.25 protocol, manufacturers of X.25-compatible equipment and X.25 network suppliers within the U.S. It interfaces directly with terminals and front-end processors for testing or can be operated remotely over full-duplex synchronous lines that use modems.

The principal applications of the simulator/tester are simulation of a X.25 network for terminal interface development and simulation of terminal input through the X.25 network for testing and debugging of front-end processors, an Applied Data spokesman explained. After installation, the device is used as a line monitor or X.25 protocol validator for all tasks of this

nature.

"The only alternatives are for the user or manufacturer to develop his own test system or to actually go on-line over the network," a vendor official added. "And if the debugging process takes any amount of time at all, the network costs can be astronomical."

Four Simulation Modes

Operations are simulated in four distinct modes: the frame manual test, which allows the user to enter frames through the terminal; the frame automatic test, which implements an automatic data generator to permit transmission of frames at any specified rate; the packet level test, which is used to send packets typed on the terminal; and the interactive terminal interface test.

The simulator/tester can be used with a CRT console to monitor the information chain exchanged by a data transmis-

sion equipment processor with a network mode, the spokesman added. The user can also troubleshoot the hardware and software and their reactions to on-line performance.

When interfaced with a CRT, the user can employ the simulator/tester's operating

commands for control of protocol parameters, frame and packet parameters, data generation and error condition generation.

Parameters are reportedly simulated at any speed if the unit under test can be externally clocked. In its line monitor mode, the simulator/tester

handles "all common" transmission speeds up to 19.2K bit/sec. Interfaces to the console can be operated at up to 9,600 bit/sec in asynchronous mode using ASCII code.

The device costs \$11,900. Applied Data is located at 14272 Chambers Road, Tustin, Calif. 92680.

Units Replace IBM 3270, 3278

BETHEL, Conn. — What are being billed as more compact alternatives to the IBM 3270 and 3278 CRT terminal systems have been introduced by Computer Optics, Inc.

The plug-compatible terminals combine Computer Optics' Mark VIII microprocessor-based CRT terminal — comparable to the IBM 3278 in capabilities — and the CO:7X78 controller, which can support up to 32 devices, including Mark VIIIs with various keyboard options and

line printers, a spokesman said.

The Mark VIII is 30% smaller and 50% lighter than the 3278 and includes such additional features as a tiltable, 1,920-character CRT screen; bonded, etched screen; line column counters; and 25th line status messages "in plain English," he added.

The CO:7X78 controller is available in both local and remote configurations. When used as a replacement for an

IBM 3270 system controller, it requires no changes in software or protocol, Computer Optics said.

Bisynchronous communications is offered now. Synchronous Data Link Control will be available in mid-1980.

A Mark VIII with keyboard and CO:7X78 controller costs \$1,800 and \$7,000, respectively. Two-year leases cost \$57/mo and \$225/mo, respectively, from Computer Optics at Berkshire Industrial Park, Bethel, Conn. 06801.

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Slave Processor Includes Four-Channel Controller

SALINE, Mich. — A slave processor with a four-channel communications controller is available from Process Computer Systems, Inc. (PCS).

The first in a projected series of intelligent peripheral controllers driven by the Z80 microprocessor, the PCS 1861A features up to 16K bytes of main memory and the ability to address all the memory and I/O in an attached PCS Flexibus II system.

As a multiprocessor, the con-

troller is especially suitable for facilities that require distributed computer power, the vendor said. The PCS 1861A can serve as an intelligent serial communications controller by providing four independent serial channels that can be configured via on-board jumpers with synchronous or asynchronous devices.

The controller is reportedly able to handle transmission speeds as fast as 500K bit/sec. Its channels are said to be hardware-compatible with all current industry communications protocols, including but not limited to asynchronous, bisynchronous, Synchronous Data Link Control, High-Level Data Link Control and the protocols employed by virtual telecommunications networks in the U.S., Canada and Europe.

For this reason, a PCS 1861A can be specified to serve as a central controller for a number of different brands of computer-controlled subsystems, a spokesman said.

The basic PCS 1861A costs \$595. Additional random access memory may be purchased for \$50 per 1K byte in 1K-, 4K- or 8K-byte units.

PCS has also unveiled its Model 1899A Multiprocessor Debug Tool as an accessory for the 1861A. Allowing simultaneous debugging of multiple CPUs, the unit permits synchronized or independent examination and alteration of memory locations in a designated processor anywhere in the configuration. It costs \$1,095.

PCS is located at 750 N. Maple Road, Saline, Mich. 48176.

Adapter Card Links Terminals With Cassettes

SAN DIEGO — A universal adapter for communications interface applications including TTL, CMOS, RS-232C, teletypewriter and frequency shift keyed sources is available from Electronic Product Associates, Inc.

The adapter can be used to provide an ordinary cassette recorder with the necessary facility to record all the keystrokes entered from a terminal during transaction entries. Record information can be used for audit, computer channel analysis or utilization or for recovery after system failure.

The 2.25- by 4.2-in. card accepts 110 or 300 bit/sec input and includes a device to provide timing markers for those input sources. A +10V 30mA unregulated or +5V 100mA regulated power supply is required.

The unit costs \$142 from the vendor at 1157 Vega St., San Diego, Calif. 92110.

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Net Recognizes Different Nomenclatures Glassworks Shatters Order-Taking Problems

By Stephen Obenland

Special to CW

CORNING, N.Y. — A large supplier of electronics parts here has developed a distribution network supply system that is not limited to assigning numbers to parts.

The system, developed at the Electronics Division of Corning Glass Works, Inc. (CGW), can process parts orders regardless of the differing nomenclatures assigned to them, allowing the user to order them with their military, catalog or industrial designations.

The distribution system is an extension of the corporation's "Marketing Information System," serving five of the CGW operating division's customer service needs. The system was installed and used internally for a year and a half prior to extending its use to the distributors during the fall of 1978.

In addition to the functions available to the distributor, the system provides order maintenance, order acknowledgement, warehouse management, picking and shipping papers, invoices and sales and order history reports. Special on-line functions allow data base inquiry and maintenance of customer, product, and price and delivery information.

IBM 3275 CRTs are supported by an IBM 3033 processor using Cincom Systems, Inc. Environ 1 and Total data base management systems. There are currently seven dial-up communications ports. The service is available from 8 a.m. to 7 p.m. to cover both East and West Coast distributors.

The 3033 also supports a plant and office network of more than 40 remote batch entry locations throughout the East and Northeast.

Multiple levels of security are implemented identifying the terminal, user and functional passwords. Response time varies with the complexity of the function being performed and with the system load, but has generally been in the 15- to 20 sec range.

Corning's Electronics Division supplies metal film and nichrome resistors as well as glass, ceramic and tantalum capacitors. Selling to a worldwide OEM business and a North American distribution organization, Corning maintains a strong customer service orientation in the discrete components market.

Customer Service Capability

The distribution system allows timely and accurate information to pass among the Electronics Distribution Services group, the warehouse in Raleigh, N.C., and the distributors. The company's aim in developing it was to provide a simplified yet fully functional customer service capability.

When a customer calls a distributor and asks for a particular quantity of parts, the distributor checks in his own system and determines whether the parts are there. If they are not, he places an order at Corning by dialing into the system on his CRT, getting through the security codes and identifying himself. Then he enters the part number and quantity.

The system comes back with the price and promise date for those items and, if the delivery dates and quantities are available, the request for parts

is turned into an order. Any user errors either in input or operation are detected, highlighted and explained in plain English.

When the order is given a number by the system, the desired inventory is immediately allocated to that order and removed from the available inventory. Moreover, the buyer can select several methods of reviewing order status. He can pick a specific order and item, review all open orders or selectively review key data.

Available Functions

Functions available to CGW personnel include shipment planning, pick and pack paperwork generation, ship-

ment reporting, invoice generation, accounts receivable data generation and access to sales and order history for reporting and forecasting. Under the warehouse management function, warehouse inventory levels are automatically reviewed and replenishment orders are generated for the manufacturing plants.

Accurate promise dates are made from current warehouse inventory, from scheduled shipments from the plants, from future planned production or from a combination of the three. For example, a potential order of 5,000 pieces might show 2,000 on hand, 1,000 in transit from the factory and 2,000 from the next planned fac-

tory lot.

In addition, because the cross-reference file eliminates the need to hunt through product literature or to translate the buyers' nomenclature to a nomenclature the system will understand, a considerable amount of time is saved getting out the order.

Many of the benefits of an on-line system can be found in the distributed system. The system allows the end user to enter and manage his own orders, cutting out clerical errors and time delays.

Obenland is manager of systems development and control at the Electronics Division of Corning Glass Works in Corning, N.Y.

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As User Consolidates Processor Replaced by Link To CPU 350 Miles Away

Special to CW

DES MOINES, Iowa — A manufacturer of agricultural equipment said it has achieved substantial cost savings for a time-critical application by replacing a remote IBM 370/148 with a communications link to a newly consolidated data center mainframe 350 miles away.

Based in Canada, Massey Ferguson, Inc. manufactures and sells a full range of agricultural equipment worldwide — tractors, combines and all the parts that make them run, including tires, batteries and spark plugs. In the U.S., Massey Ferguson maintains a master parts warehouse in Racine, Wisc., to provide parts distribution to the company's 12 regional service warehouses located throughout North America.

"There are various quantities of approximately 110,000 farm equipment parts and assemblies in Racine," according to Mickey Cary, manager of Massey Ferguson's Des Moines data center. "Coordinating inventory balance and parts flow through Racine is a critical link in the entire parts distribution system, and our responsiveness is extremely important because it's our direct link to the customer."

"Unlike some other industries, our long-term success hinges on our responding to the farmer's own time-critical need for equipment — and for parts, if they are needed — particularly at harvest time, when a failing tractor part can cause severe time and money loss to the farmer," he explained.

Consolidation Plan

In mid-1978, Massey Ferguson wanted to consolidate Racine's stand-alone 370/148, used for the on-line inquiry application, plus another, Toronto-based mainframe, into the company's primary data center in Des Moines. The Des Moines system was being upgraded to a 370/168 with more than 2.5G bytes of on-line data storage, and significant cost savings could be achieved by reducing remote hardware and tying the two locations, Racine and Toronto, into the Des Moines system.

"We knew that consolidating into one large Des Moines system would bring us several benefits," Cary said. "Not only would we save money by reducing hardware costs, but we'd have tighter control over these computer operations in Des Moines, which is the financial processing center for North American operations."

Replacements Made

"We were able to replace the Toronto mainframe, a 370/158, with a series of minicomputers feeding into a concentrator tied to Des Moines. This caused some degradation in response time, but manufacturing response isn't as critical," Cary said.

In August 1978, Massey Ferguson installed a virtual data link system using PIX II mini-based local and remote terminals from Paradyne Corp. Now Racine's 50 to 60 CRT terminals and six printers interface to two PIX mini-based remote control units (RCU) in the master warehouse.

These communicate with two PIX local control units (LCU) attached to the

new 370/168 in Des Moines via IBM's Synchronous Data Link Control (SDLC) full-duplex protocol. To Racine's CRT terminal operators, the RCUs provide response times reportedly equivalent to those possible with a local mainframe. And to the Des Moines 370/168, the LCUs appear as local terminals.

A Further Complication

"In Racine it was much different," Cary observed. "The parts managers, planners and 'pickers' were used to getting fast, on-line access to their own local mainframe for such inquiry functions as new inventory placement, shipping instructions, inventory forecasting and balancing and for tracking not only Racine's parts inventory, but the inventories and replenishment needs of regional warehouses — and local dealers — as well."

"They were used to getting fast response from their own local mainframe. Now we were going to put them on a remote mainframe that was shared among many users."

In addition to maintaining fast parts inquiry/response for the Racine parts staffers, the Des Moines mainframe consolidation faced a further complication: the on-line parts inquiry program, written for use with a local mainframe, would need to be rewritten with communications interfaces for the remote Racine terminals before being installed on the Des Moines Model 168.

"We realized a remote concentrator couldn't give us the terminal response we needed in Racine, and we didn't want to add teleprocessing hardware and software to the 370/168 to service the Racine on-line terminals — about 50 to 60 of them," Cary recalled. "At the same time, we knew that Paradyne's PIX II systems could satisfy the high-transmission speed requirement because they use SDLC protocol, and they could plug into the 168's byte multiplexer channel as a local attachment."

The PIX systems use a total of four 9,600 bit/sec communication lines — more than enough capacity to handle the average 10,000 transactions between Racine and Des Moines each day.

'Really a Luxury'

"The PIX link typically runs at about 60% of its capacity," Cary said. "In fact, we might have been able to get away with just a single PIX II system, with one RCU and one LCU, but we like the added luxury of extra capacity — it's useful for assuring fast turn-around even at times of high usage, it gives us room to grow in data communications traffic and it provides a measure of redundancy in case of a line or equipment failure."

"The two PIX systems really are a luxury, so to speak, when you consider how much money and time they save us," he added.

"Our users, the parts people in Racine, are getting on-line response of just several seconds. And Massey Ferguson is saving about a quarter million each year as a result of Racine's hardware reduction."

Disk Cache Viewed DP Problem Solver

By Howard A. Karten
CW Staff

The Memorex Corp. Model 3770 disk cache introduced in April 1978 represents an attempt to solve present, pressing DP problems rather than an application of futuristic technology, according to a Memorex official.

In addition, the device — which Memorex has recently begun to ship — serves as a selling point for the firm's disk drives even if customers don't install the cache, because the cache can be installed only on Memorex drives, according to Mark Lutvak, manager of product sales and support.

Stressing that the disk cache was simply a new application of an existing technology, Lutvak said that the fundamental parts of the drive were semiconductor memory and an algorithm used to manage track usage.

When the drive is initialized, the contents of entire tracks of data are moved from the disk into the memory as they are requested by the attached controller. When all available memory in the cache has been filled, a

'Most of the data Memorex has collected on the performance of the cache has been favorable . . . Not all jobs will show this improvement, however; in backing up or restoring a disk pack, there can actually be a performance degradation.'

memory manager — a microprocessor — begins to keep track of the data usage.

Subsequent requests for data cause the device to check its memory to determine whether the data is already in the cache. If it is not, the data is brought in, and the least recently used track is swapped out.

This approach has several advantages over other attempts to alleviate the I/O bottleneck, including multiple actuator arms, Lutvak claimed. For example, under some circumstances, delays attributed to physical causes, such as rotational delay and latency, are reduced.

Most of the data Memorex has collected on the performance of the cache has been favorable, Lutvak contended. For example, tests at one customer site showed improvements of up to 259% over the same jobs run on disks without the cache. Not all jobs will show this improvement, however; in backing up or restoring a disk pack, there can actually be a performance degradation.

To get around this problem, Memorex has provided a control panel that can be used to bypass the cache, Lutvak noted.

It was the advent of higher capacity, lower priced memory chips and microprocessors that made the concept viable and economically feasible, Lutvak said.

Squeaky DP Wheels Greased

By Howard A. Karten
CW Staff

DETROIT — Although American Motors Corp. (AMC) here tries hard to avoid making products with squeaky wheels, it nevertheless believes in being a squeaky wheel when it comes to dealing with its computer vendors, according to Martin Mutz, AMC corporate director of systems.

"With any vendor, you get what you demand, and we've demanded certain things that Honeywell, Inc. has had to supply for us or else, [we've told it.] Honeywell can't be our vendor; and they've responded," Mutz said recently. "It's the squeaky wheel that gets the grease."

Under Mutz' direction, the company recently scrapped most of its aging IBM

hardware, replacing it with several different models in Honeywell's Series 60 line. For example, two IBM 370/145s in Detroit were replaced with Honeywell Series 60 Level 66/60 dual processor; a pair of IBM 360/50s in Kenosha, Wis., were replaced with Honeywell dual Model 40s; and a single Model 50 in Toledo was replaced with dual Honeywell Model 20s.

Two Alternatives

The country's fourth largest auto maker chose Honeywell after pondering an upgrade of its then-IBM hardware. Increases in the work load on that equipment made the upgrade necessary, so AMC weighed two alternatives: upgrading from DOS to OS on IBM hardware or

(Continued on Page 46)

Installs IteI Printers

Bank Goes for Laser Graphics

Special to CW

MEMPHIS, Tenn. — Union Planters National Bank here has become the first DP shop to install IteI Corp. 7800 nonimpact laser-graphics printers. The two printers replaced two IBM 1403s and an IBM 3211 impact printer.

The bank, whose other DP equipment includes an Amdahl Corp. 470V/7, IteI 7350 disk drives and Storage Technology Corp. dual-density tape drives, provides on-line support for a tristate network linking 100 correspondent banks.

"We use microfilm and microfiche extensively, but much of the output, such as customer bills and statements, can't be put on microfilm," according to Robert E. Weir, senior vice-president and manager of the bank's Management Support Division.

The bank had ordered an IBM 3800 laser printer, but canceled it because the IteI unit seemed like "a better price/performer," Weir said. He declined to state exactly how much more attractive the IteI unit was, saying only "it was measurable."

"We determined two years ago that the IBM system configuration we were using was rapidly nearing its capacity limit," Weir stated. "We decided to replace our system with a totally new approach that would allow for significantly increased capacity and greater price/performance benefits."

Some of the jobs for which the printers are used include accounts receivable, personnel applications, savings, installment and commercial loans and demand deposit accounting.

'Negligible' Maintenance

Maintenance on the two units has been "negligible" and downtime "practically zero

— and the two IteI engineers on-site don't sit around with their screwdrivers constantly fiddling with it," Weir reported.

The printers are used around the clock, with the heaviest usage coming between 6 p.m. and 10 a.m. Although they are not "worked to death," they are nevertheless "kept busy," Weir commented.

The units have helped the bank reduce its printing time by a factor of 8, the vice-president noted. "We are now able to handle greater volume and meet all deadlines for our own printing schedules and those of our correspondent banks."

The bank is the lead bank of Union Planters Corp., a holding company formed in 1972.

Spur Schools Suny In Maintenance

By Tom Henkel
CW Staff

FREDONIA, N.Y. — Spur Products, Inc.'s do-it-yourself controller maintenance program has been well received by at least one user, the State University of New York (SUNY). SUNY officials said the program is a big improvement over its previous maintenance program with Sorbus, Inc.

Sorbus' nearby Buffalo office is also happy the do-it-yourself program came along because Sorbus technicians didn't have enough experience with Spur controllers to fix them, field representative Rob Bard admitted.

"Sorbus was a disaster. [Sorbus technicians] only had several hours of training on

(Continued on Page 46)

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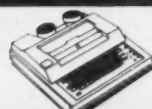
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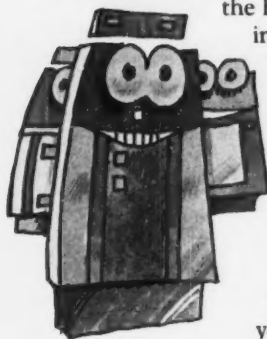
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In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

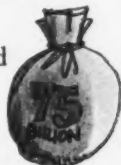
But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible.

Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

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market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at \$75 Billion, and growing by 20% a year.

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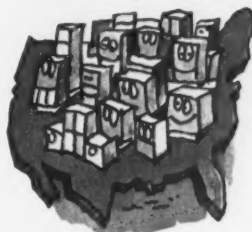


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computer industry whose organizations are involved in the manufacture or integration of computer systems. This is a relatively new marketplace which has grown up around the minicomputer and micro-computer, and which shows every sign of very rapid growth for at least the next decade.



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Suny Pleased With Do-It-Yourself Maintenance

(Continued from Page 43)

the device. They got it here, that's how I know.

"Sorbus is not staffed well enough in this area to make a service call to Fredonia. [Technicians] came from Buffalo, which is about 45 miles from here. It was often several days before they would show up. Then they would poke around, scratch their heads and say they didn't know what the problem was. Then they'd say they would get back to us. It was useless," according to Dr. Fred Ullman, director of the Suny systems center.

"We took it as a favor to Spur," Bard said. "In Fredonia, it was just a bad deal. It was so far south of our maintenance area, they did suffer. We came to

a mutual agreement that it was disastrous for both of us, so I guess Ray Lorenz [the president of Spur Products] gave them a crash course and some parts."

Simple Procedure

"You can run the tester without knowing electronics; it's a matter of sliding five printed circuit boards into slots. It's a very simple procedure, but not all problems can be solved with the tester. Sometimes you have to take an oscilloscope and look at certain signals," Ullman said.

"When you do it yourself, you're not really alone. You've got their backup on the phone. Normally you describe the symptoms and suggest diagnostic procedures. Then you run the tester

up until something fails. [Spur] gives you a complete set of spare boards." Once the problem is detected, it's usually a matter of replacing one of the boards, Ullman added.

When Spur developed its controller — which allows an IBM 1403 printer to interface with a non-IBM CPU — seven years ago, it gave Grumman Data Systems Corp. the marketing rights. Grumman maintained the rights, as well as the service contracts, until last August, when Spur took over marketing and started the do-it-yourself program, Lorenz stated.

While Grumman was doing the marketing, Bard said, the Sorbus technicians weren't given enough experience on the controller to adequately fix it. In addition, the technicians were trained

on IBM equipment only, while the Spur controller interfaces with non-IBM CPUs.

At Suny, "we didn't have a tester or any experience with the CPU, and IBM serviced the printer. There were three parties involved and [Sorbus] was in a very compromising position between the two of them. It was a finger-pointing thing," Bard said.

After switching to the do-it-yourself program, most Suny problems have been solved.

On the three occasions the controller needed service, a trained technician on the Suny staff was usually able to fix it. When the technician recently left Suny, "there was someone here from Spur in less than 24 hours" to solve the most recent problem, Ullman said.

Vendor Greases Squeaky Wheel

(Continued from Page 43)

switching vendors entirely.

One reason for considering Honeywell hardware was the company's favorable experience with a General Electric Co. GE-635 left over from the days of GE's ill-fated joint venture with Honeywell.

"We would have had to do a conversion [in either case], so we felt that either one involved the same amount of work," Mutz commented. "If you look at what a conversion is, it's reloading your files, recompiling programs and changing JCL. It's work, but no more than converting from DOS to OS.

"We feel that manufacturers have to provide upward growth and change to stay abreast of hardware technology without forcing users to tear up their application programs, and Honeywell has demonstrated that," Mutz said.

However, this is also true of converting from, say, an IBM 370/158 to a Model 168. What, then, swayed Mutz to go with Honeywell?

"I've had Honeywell's top executives in here," Mutz explained, "and I've demanded that they support us in a way that's acceptable to us, and I've gotten that.

"They were more than happy to come, especially [because Honeywell wanted us] as a new account. They wanted to represent the company favorably to us, and they didn't hesitate to bring people out. In that process, I reviewed with them what our requirements were in terms of support, and they've always agreed to support us — especially [as a new account]."

In addition to this support, Mutz is particularly pleased by Honeywell's operating system software and the compatibilities he feels he has observed between the company's mainframes and its minicomputers. "This provides an environment in which user application programs can be developed and enhanced without expensive and time-consuming conversions."

AMC's mainframes are linked to each other in a communications network that Mutz described as a distributed system, but one used mainly for information exchange. Assembly plants produce information throughout the day that is fed into a central record-keeping system, although some of it is processed and then sent back to the originating location.

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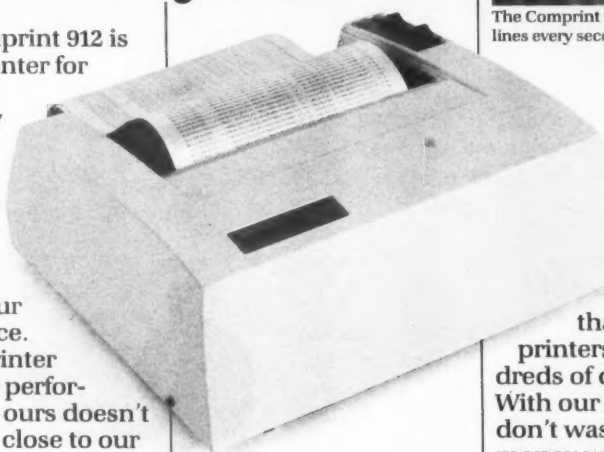
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CRT hardcopy is an excellent application for the Comprint 912.

Dema Survey Finds Data Entry Managers Getting More Recognition

By Jay Woodruff
CW Staff

STAMFORD, Conn. — Data entry managers are receiving more recognition for their work, doing more kinds of work and playing a greater role in the selection of data entry equipment.

These are some of the trends that appeared in the 1979 member equipment survey conducted by the Data Entry Management Association (Dema), as well as those revealed by member responses to questions asked by *Computerworld*.

Of those who responded to the survey, 36% said they would replace their key-to-disk and on-line equipment if given the opportunity. Within the next

year, 28% plan to increase their data entry staffs.

Data entry managers have a strong influence in equipment selection, the survey showed. Seventy-two percent of the respondents said they are responsible for the selection of 50% or more of the equipment, while 25% are responsible for all of it and 85% have at least some influence in the selection process.

Middle management people who deal with data entry managers increasingly appreciate the data entry manager's role in the company, overcoming some of the prejudices so long associated with that aspect of information processing, CW was told.

Data entry is becoming more professional because the technology has improved, according to George Anna Kennon, supervisor of key processing at Allied Chemical Corp. in Houston.

"As a supervisor, I'm in the manage-

ment ranks. My opinion is requested about new systems or for revising old ones. There is more technology so we can discuss such things as user coding improvements and reformatting capa-

(Continued on Page 48)

CCI Ratings Improve

STAMFORD, Conn. — Consolidated Computer Corp. (CCI) had the only key-to-disk data entry system that showed an improvement in all ratings categories in this year's Data Entry Management Association (Dema) equipment survey.

The annual survey solicited user ratings of vendor equipment in the following categories: response time after service call, availability of spare parts, length of time required to make repairs, programming support, training assistance, willingness to change software to the user's specific needs, operator acceptance of equipment and usefulness of statistics package.

Norman Bodek, creator of the survey and president of Dema, stressed that the survey is not intended as a comparison of vendors because "each respondent rated only his own equipment, and people rate differently."

In this year's survey, CCI's Model 60 advanced from its ranking as an average key-to-disk system to one of the most highly rated units, judging from the responses of approximately 100 Dema members who manage 2,708 data entry stations from a variety of vendors.

Generally, however, where such comparisons could be made, models rated this year suffered in comparison with their ratings last year.

Pertec Computer Corp.'s Model 6, for example, has a statistics package that was rated excellent last year and only average this year.

An older machine, the Model 6 lost ground in other categories such as response time after call, availability of spare parts and length of time required to make repairs. However, the Pertec Model 1800 showed only minor slippage in most of the first six ratings parameters and actually improved its already excellent ratings for operator acceptance of equipment and usefulness of statistics package, the report indicated.

The IBM 3760 and 3762 both received nearly excellent ratings for vendor service but scored below average, according to users, in willingness to change software to the user's specific needs. Operator acceptance of the equipment was rated very good.

The IBM Video 370 on-line data entry CRT station was rated somewhat lower in all categories than the 3760 and 3762. Users asked for a "more intelligent CRT and [reduced equipment size] without making the screen smaller. More program levels were also urged," the report said.

All Inforex, Inc. models as a whole ranked above average in all categories except for programming support, where they were ranked average. The Model 1303 slipped in every category except for vendor willingness to change software to specific needs.

A copy of the survey, which includes rankings for other vendors such as Data 100 Corp., Four-Phase Systems, Inc., General Computer Systems (a division of Telex Corp.), Univac and Decision Data Corp., is available at no cost from Dema, P.O. Box 3231, Stamford, Conn. 06905.

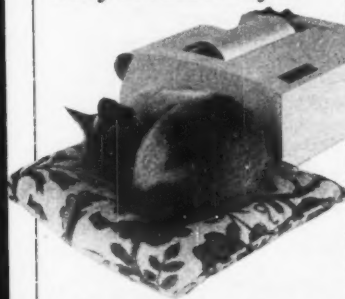
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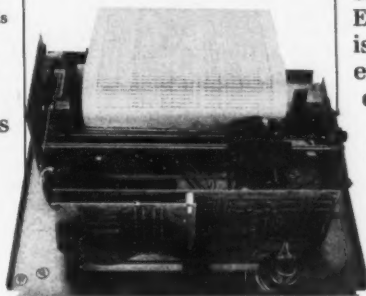
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impact. The Comprint 912 has no mechanical print head banging on the paper. It's electronic. It's quiet.

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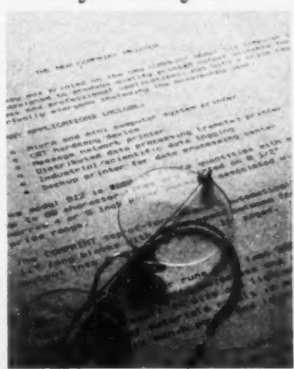
Since the Comprint 912 prints electronically, rather than mechanically like ordinary impact printers, we have fewer moving parts and less vibration. The Comprint 912 has fewer things to go wrong and less wear. That's why we

offer a 6 month warranty, twice the industry standard. The key to all this superior performance is our special



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Cleaner Out For IBM Disks

CHATSWORTH, Calif. — A magnetic disk cartridge cleaner for front- or top-loading IBM disks is available from Data Devices International.

CMS-III accommodates top-loading 5440-type and front-loading 2315-type disks. The cleaner can also be used on .050- and .075 mil substrates.

The portable unit will clean both disk surfaces in about 15 seconds, the vendor claimed. The cleaner uses pre-packaged cleaning pads, which are saturated in alcohol.

CMS-III costs \$1,395, the vendor said from 20235 Bahama St., Chatsworth, Calif. 91311.

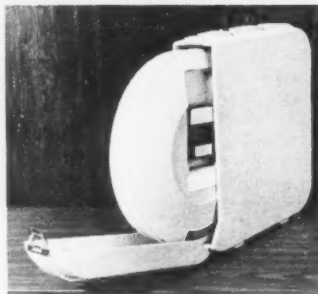
IBM, DEC Disk Cartridges Get Plastic Storage Case

LOWELL, Mass. — A dust-proof plastic storage case for transporting IBM and Digital Equipment Corp. disk cartridges is available from Scopus Corp.

Each case will hold one top-loading IBM 5440, DEC RLO1 or RKO6 or -7 disk. It will hold two DEC RK05 or IBM 2315 front-loading disks, Scopus said.

Equipped with a swivel handle and safety latch, the case can stand vertically or can interlock with other cases for horizontal storage, the vendor said.

The 3-lb case costs \$25 and currently will handle only IBM or DEC disks. However, Scopus plans to market similar cases for disks from other vendors,



Scopus Storage Case

a spokesman said from 710 Chelmsford St., Lowell, Mass. 01851.

Managers Get Recognition

(Continued from Page 47)

bilities."

However, although middle management is paying more attention to data entry and regarding it in a more professional light, that recognition has not yet been displayed by upper management, she said.

So although management may look upon data entry as more professional, "they don't pay professional," she remarked. In order to move herself into a higher position ("I'm at the top of my pay level as a data entry supervisor," she said), Kennon returned to school to pursue another degree.

Maury Snow, department chief at Western Electric in Atlanta, is in charge of data entry and billing for Southern Bell and South Central Bell Telephone. With 97 people working on the day shift and 24 working at night and with 76 terminals and eight key-punch systems, the data entry department consumes a budget of \$2,700,000.

Since he took over data entry nine months ago, when those responsibilities were added to those of running the billing operations, Snow's conception of data entry has changed, he said.

"Frankly, before taking over here, I didn't appreciate it," he admitted. "The most annoying part is that so many kinds of jobs come through data entry organizations, and most people don't appreciate the knowledge that operators have to keep things running."

"Although data entry is not given the recognition it should have, it's moving to the forefront because 90% of the data that goes into the computer goes through data entry. More and more, it is becoming appreciated."

Seeking Expertise

Ralph Wills, data entry supervisor at Union Oil in Schaumburg, Ill., supervises 55 people working two shifts. He has noticed that "management of user services has sought our expertise, asking, 'How do you think we can do this?'"

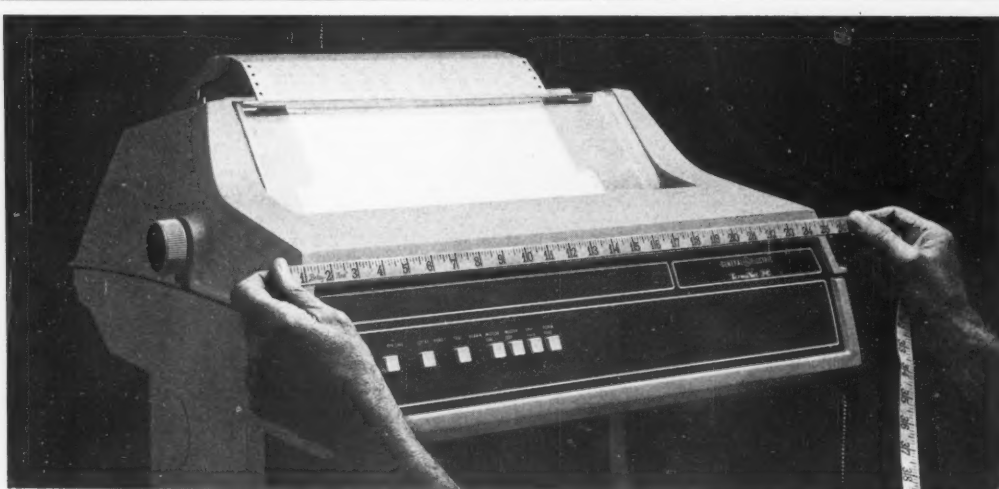
Wills said he points out to his managers that his is not a keypunch department but a data entry department. His operation is key-to-disk, and data entry personnel now handle different tasks. They are presently working to reduce duplication of effort by cutting down on the reentry of data in a different form.

Reducing Turnover

At RCA Music Services in Indianapolis, Vincent Dumm suggested that ways be found to reduce the turnover in data entry personnel caused by the monotony of "eight hours a day of keystroke."

As manager of fulfillment services, which includes handling 55 million pieces of incoming mail and 44 million pieces of outgoing mail each year, Dumm is consolidating data entry with optical character recognition, "scanning what we can and keying in the rest."

"Out of about 50 operators, turnover is high. We're trying to assure them that we're trying to free them up," he explained. Although it is difficult to get away from the fact that data entry can be tedious, he is looking for "pieces here and pieces there" to break up the work load.



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In Search of Disciplined Documentation

By Robert Perron

IN DEPTH

While manufacturers and vendors pay lip service to providing adequate supporting documentation for their software systems, the reality is quite different. Only on rare occasions do simple, comprehensive manuals accompany software to the customer.

Higher management tends to feel that the documentation requirement is met with the production of so many manuals containing so many pages. On a working level, supervisors tend to beg the question of quality to the individual technical writers, the ultimate solution being to hire "good" writers and fire (or otherwise dispose of) "poor" writers. Software users generally acquiesce in this state of affairs by accepting inferior documentation as the norm.

The first part of this article outlines what I believe are the major deficiencies and difficulties in software documentation today.

My intent is not to castigate writing shops, for they are generally working within the state of the art, but simply to awaken them to the problems and to encourage them to improve the state of the art.

The second part of the article suggests steps for improvement. The basic motif is a structured, top-down discipline.

Although writing shops may incorporate analytic and design efforts to varying degrees, the organization and scope of these efforts as suggested here depart sharply from current practices. Bear in mind that these suggestions hardly represent a syllabus for change, but merely point in the new direction.

The detailed steps and examples included in the sections on analysis and design serve only to make the suggestions more concrete and comprehensible. They are hardly intended as the definitive methodology. Development of the methodology will require much further study and work.

Technical Writer as Artist

Many shops still consider the production of software documentation an

art form, where each manual emanates from the creative genius of the writer. (The documentation effort unfortunately falls down when the writer turns out not to be a creative genius or the genius has a bad day.) Inspiration enters the writer's head and travels through the arms to the fingertips, where a mysterious transformation into concrete words, figures and tables occurs.

Of course, even a cursory analysis of the writing process reveals it as the application of form to information and suggests that further study may disclose a method to the process. Yet shops persist in the belief that the process is necessarily individual and mysterious.

While individual writers may informally analyze their work and develop standard modes of operation, and while they may improve on their modes of operation from manual to manual, those that supervise writers have (by and large) not taken steps to formally analyze the writing process and develop standard methods on a collective basis. Development efforts above the writing level typically consist of naming the manuals in a set and perhaps deciding the general content of each. The writers then determine the specific content of the manuals while writing them.

Some supervisors do provide a more comprehensive development effort. They determine (or have a senior writer — documentation analyst? — determine) the major blocks of information that must be documented and base the makeup and general content of the manual set on this analysis.

Few shops, however, carry the above-the-writer-level development effort beyond this depth. In fact, the situation is more likely to be worse, with the manual set simply falling out of the software specifications.

Once the manual set is more or less decided, the manuals are typically divided among the writers. The more experienced writers — the creative giants — naturally work on the more conceptually difficult manuals such as

the summary descriptions and programmer's guides, while the less experienced writers handle the utilities manuals and message guides.

In fact, the manuals assigned to the less experienced writers may not be less difficult to write. The supervisor may simply conceive them that way.

The more experienced writers may be called upon to review the work of the less experienced, offer helpful hints and otherwise aid their less gifted

End users get the software documentation, they deserve, the author contends. Manufacturers routinely produce insufficient, inferior documentation, and end users perpetuate the practice by accepting it. Still, there is hope: a disciplined approach.

brethren. But the assistance to inexperienced writers is seldom front-ended, seldom thought out to any length and seldom structured. Assistance normally does not progress beyond informal guidance and reviews.

Deja Vu/Jamais Vu Syndrome

Consider this typical scenario: A manual set has been completed and distributed to users of a system. In an office off the computer room, the conscientious first-shift supervisor looks over his new utilities manual while enjoying the first cup of coffee of the morning. On Page 5-3, he reads, and rereads, the following paragraph:

"To journalize updates to a file:
1) The programmer must include a JOURNAL card in the control deck.

2) The operator, when the job stops, must mount the journal tape as directed."

The supervisor peers over his reading glasses and mutters, "I feel like I've read this before." Fearing for his sanity, the supervisor starts thumbing

through other manuals in the set. On Page 2-5 of the summary description he locates the following paragraph, but cannot decide if it pertains to the topic at hand:

"Essential to the recovery process is journalization of files, which take place only when so indicated."

He continues searching and, to his re-

lief, finds the following paragraph on Page 6-7 of the operator's guide:

"When the system instructs you to mount the journal tape, mount a tape. (See "Tape Mounting and Demounting" in Section 2.) NOTE: A JOURNAL card must be included in the control deck."

At least, thinks the supervisor, the point is well covered. Better said twice (or thrice?) than not at all.

At that moment, he answers his telephone only to be subjected to a stream of abuse by a member of the programming staff. "How could we back it out?" he replies heatedly. "You never put a JOURNAL card in the control deck."

"JOURNAL card?" the programmer says. "I never saw mention of a JOURNAL card in the programmer's guide."

Anyone involved in computer programming or operations has seen the above scenario played out time and again. It reflects the most common structural defects in manual sets: the
(Continued on In Depth/3)

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IN DEPTH

(Continued from In Depth/1)

needless repetition of information; the difficulty in locating information; the lack of information where it is needed; and the variation in style from manual to manual. Quite often, information is simply missing.

The perpetrators of most manual sets fail in two primary tasks which (it would seem) should be performed prior to writing the manuals. First, the writers of the manual should know in some detail what information must be transmitted to the users. Second, the writers should know where to place this information for best effect.

What Is Craftsmanship

Let us briefly analyze a not-too-bad sample of technical writing that might appear in any of hundreds of reference manuals:

"The user must specify the following parameters:

- ° item-name — An alphanumeric string of up to 10 characters that uniquely identifies the item; required.

- ° item-length — An integer in the range 1-256 that designates the length of the item; required.

- ° key-designator — The character P, S or N to designate a primary key, secondary key or non-key item; optional with default of N."

Construction of the paragraph required considerable effort on the part of the writer. Note its parallel structure both in grammar and in the presentation of information. Each display element in the paragraph consists of a name in lower case, followed by a dash, followed by a sentence fragment.

The only inconsistency in the grammatical structure is the use of a phrase — "to designate" — in the last element vs. the use of clauses — "that uniquely

identifies" and "that designates" — in the first two elements.

As for the presentation of content, each element consists of a parameter identification, followed by its physical attributes, followed by its function, followed by its required/optional status.

Most of the writer's effort was spent developing the first element. The remaining elements were simply patterned after the first. The writer should continue to use this pattern

throughout the manual, not only saving himself the effort of developing another style for describing parameters, but providing the reader with a uniform presentation.

For the experienced writer, developing formats comes quickly. He remembers and refers back to (perhaps using notes) past writing efforts.

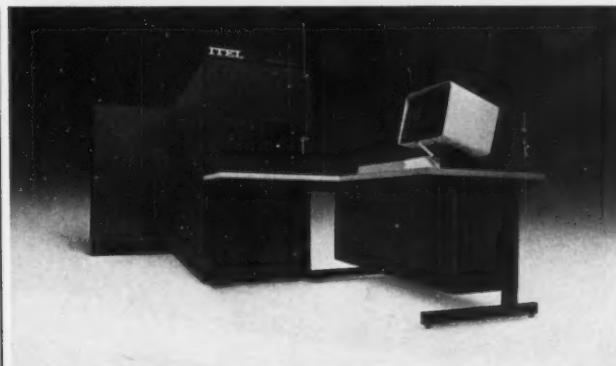
For the entry-level writer, the experience may be slow, arduous and riddled with errors. Structures are not likely to be parallel throughout the manual.

They are not even likely to be parallel on the same page or within the same display.

It would seem that the style of presentation should be worked out before the writing effort begins, with experienced writers actively assisting inexperienced writers. With forethought and discussion among the writers, the best style possible might be developed. (Are displays or tables better for transmitting information on parameters?)

(Continued on In Depth/7)

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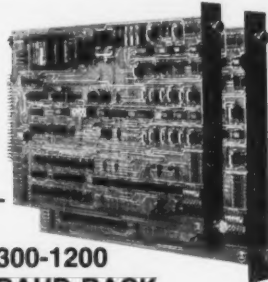
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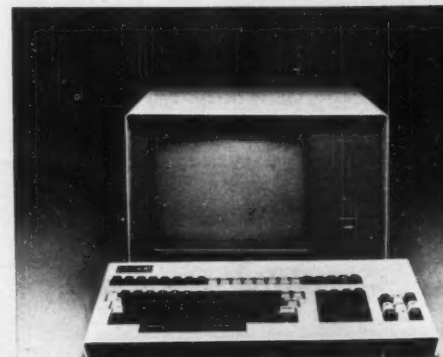


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Q INFOTON 400

(Continued from In Depth/3)

At the very least, the style of presentation for the same types of information would be consistent.

The Literate Writer

The training the writer receives in the profession explains a lot about the quality of software manuals. Most writers have received no formal training—not one hour—in technical writing, much less software technical writing.

Institutions of higher learning do not teach it. True, courses and even degrees in technical communications exist, but most courses tend to be general in nature, with little development of practical skills.

On the job, the new software writer may receive classes in the firm's software, but none in writing. Style guides and editorial assistance are normally confined to usage, terminology and layout standards in which the writer must be versed, but they hardly get into the primary problem of transposing technical information into manuals. On-the-job training usually consists of an informal apprenticeship. ("This is Bo, one of our senior writers. Give him a call any time you need help.")

The difficulty of the new writer's situation is exacerbated by the tendency for software writers to be persons with a literary background who must "pick up" the technical end. Depending on the quality of the software, the aptitude of the new writer, existing tutorial aids and other factors, the new writer may or may not learn the software rapidly.

Receiving little or no guidance as to methodology presents one difficult obstacle to the novice writer. Not knowing the subject matter presents a second formidable obstacle. The combination can be quite overwhelming.

Under the present arrangements for training and guiding writers in most shops, manuals written by entry-level

writers are bound to be poor; development of writers to intermediate and senior levels is haphazard and uneven; and uniformity of style within a shop is virtually impossible.

Without carrying the analogy to extremes, a comparison of programming in its early days to technical documentation in its present state yields some striking similarities. Programming, too, was largely considered an art form, with the work of analysis, design and coding carried out by one person.

Methodology was largely informal, with programmers learning through experience certain sequences of instructions that worked best to attain certain results. More attention was paid to the development of efficient and aesthetically pleasing code than to analyzing the problems of the applications and designing programs based on the analyses.

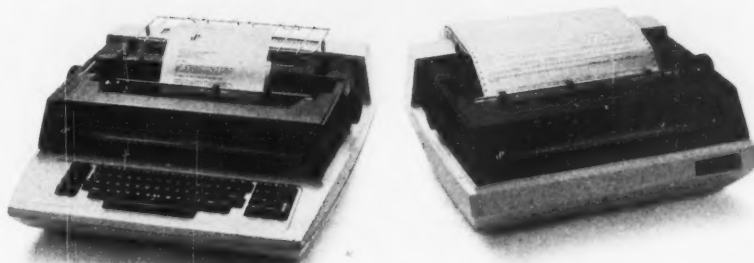
Macros and high-level languages led to similar, standardized techniques for performing coding operations. As the

coding operations became more structured and less mysterious, design and coding became separate disciplines. And as software shops concentrated more effort on design, they discovered the benefits of thorough analyses, top-down planning and modularity.

Cobol, especially, led the way to standard programming methodologies by widely promulgating a discipline that forced programmers to structure their data and procedures as a prelude to

(Continued on In Depth/8)

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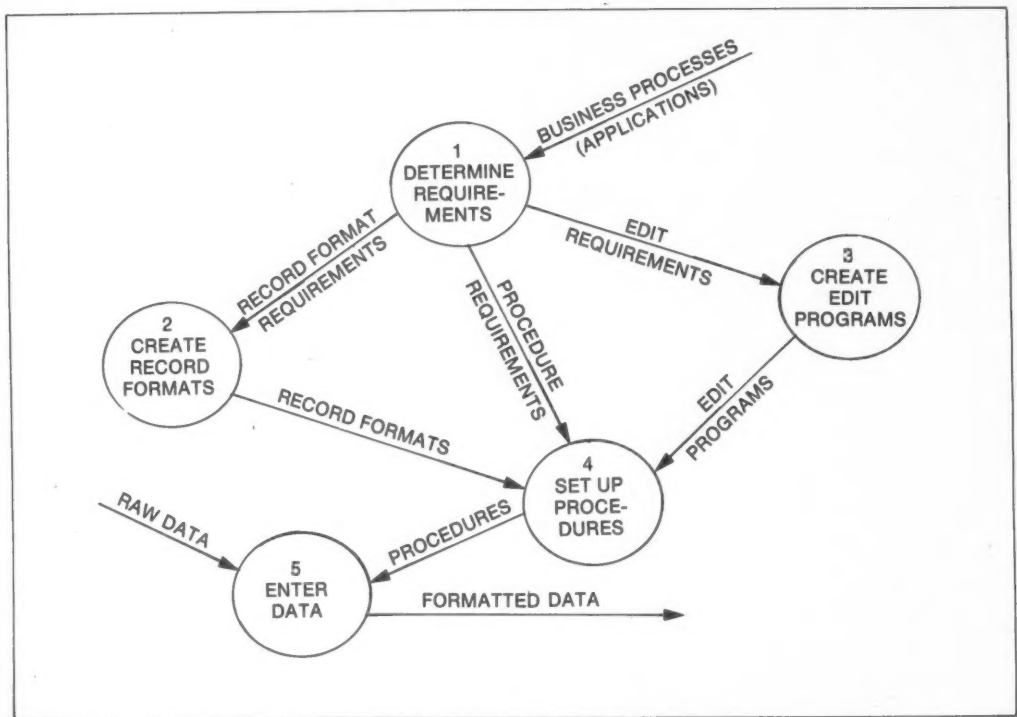


Figure 1. High-Level Use of Sample Data Entry System

(Continued from In Depth/7)
coding.

While programming progresses towards a highly manageable discipline, software documentation, for the most part, remains in a pre-nubile state. Just as early programming shops emphasized coding to the exclusion of analysis and design, so do present documentation shops emphasize writing to their exclusion.

As with programming, the benefits of analysis and design are not immediate: in programming, they do not produce, as an end result, executable code; in writing, they do not produce a draft. To the vendor whose primary concern is putting down so many words in so

many manuals to send out with the tapes, any time spent on tasks other than putting the words on paper seems a waste. To writers and supervisors, putting words on paper is reasonably concrete work, while planning to put words on paper seems like a step into the twilight zone.

Finally, developing a methodology to produce documentation in a disciplined manner requires effort over and above production itself.

In programming, the time and effort devoted to developing methodologies has for some time been worthwhile because of the tremendous monies poured into software development. In addition, the number of people em-

ployed in the field provides ample resources from which to pare off ideas and energies. Disciplining the programming effort did start out slowly, however, and only in the past few

years, as ideas and methods have been published and discussed, has discipline become accepted.

Naturally, the documentation effort, with fewer resources and less prestige, is not going to blossom into a discipline overnight. But this does not mean that a top-down discipline proceeding from analysis, through design, to writing is impossible. The remainder of the article suggests steps in that direction.

Analysis Procedure

The documentation analyst must be familiar with the product — the software system being documented. Before starting the analytical process proper, then, the analyst studies available specifications and queries the software development group until he understands the system's capabilities.

The analytical process proper starts from the user and works back to the developer. Now not many documentation shops maintain direct contact with their users, and for systems still in the development stage, only potential users may exist. But if at all possible, the analyst should spend time with several users or potential users. Second best is to have a developer, marketing representative, support person or oneself play the role of user.

First, the documentation analyst determines what the user will do with the system; he may require assistance from DP and business analysts in this task. Next, the documentation analyst determines what knowledge the user

CATEGORY	DESCRIPTION
Determine requirements	Business analysts determine what the output files (the formatted data) must look like and what record formats, edit programs and procedures are needed to attain the result.
Create record formats	Operations supervisors design record formats according to the requirements and maintain them in the format library.
Create programs	Programmers design programs according to the requirements and maintain them in the program library.
Set up procedures	Operations supervisors combine record formats and programs into procedures according to the requirements and maintain them in the procedure library.
Enter data	Operators enter raw data per the procedures. The formatted data which results is transferred to a tape, printer and/or mainframe.

Figure 2. Usage Categories of Sample Data Entry System

		ANALYST PROGRAMMER SUPERVISOR OPERATOR			
CONCEPTUAL	Raw Data	X	X	X	X
	Formatted Data	X	X	X	X
	Record Formats	X	X	X	
	Edits	X	X	X	
	Programs	X	X	X	
	Procedures	X	X	X	X
REFERENCE	Hardware Basics		X	X	X
	Software Basics		X	X	X
	Determining Req'ts	X			
	Formatting			X	
	Programming		X		
	Setting up Procs			X	
	Entering Data				X

Figure 4. High-Level Knowledge Required by Users of Sample System

requires.

Figure 1 illustrates the high-level results of an analysis of the use of a simple (overly simple, really) data entry system. The hardware consists of a processor, disk, tape, mainframe communications link, printer and terminals. The software consists of a multi-tasking system that formats and stores keyed data according to user specifications.

By studying the flow of information through the system, the documentation analyst has separated the various operations that may be performed on the system into the five major usage categories shown in Figure 2.

The high-level results are supported by detailed analyses down to the level where items of information are being passed. Figure 3 illustrates breakdowns of two of the high-level processes. Note that Process 2.3.3 ("Define Attributes") must be broken down to yet another level to demonstrate the requirements of each attribute.

The representation the analyst arrives at, of course, is the median use of the system. Individual users are bound to differ in their specific employment of the system. When significant differences are discovered, however, they should be recorded separately. (Note also that the example is kept simple to serve the ends of exposition. It does not contain the many complications normally associated with software systems.)

Figure 4 illustrates the knowledge the various categories of users require to make the system work. The illustration is top-level. Detailed requirements must be worked out to support the top level.

As previously mentioned, this quick sketch of the analytical process in documentation is not intended as a definitive methodology. Its intent is to develop an appreciation for the scope and depth of the work involved. At the very least, the steps and example presented here demonstrate that the process is not cursory, not administrative, but requires detailed technical work.

Design Process

The documentation designer determines how to present the information required by the user to operate the system. The starting point consists of the information requirements determined by the analyst in the preceding phase. The designer's concerns are primarily two: content and style.

Although the documentation analyst and top-level designer are likely to be the same person — a supervisor or senior writer — and the analysis will require some revision as the design phase proceeds, the phases of analysis and top-level design should be formally separated. A good way to do this is to require a detailed written report at the end of the analysis phase and to review it before proceeding with the design. If the phases are not formally separated, the analyst/designer will too easily mix them at higher levels and will come up with cursory analysis.

The designer starts by grouping ma-

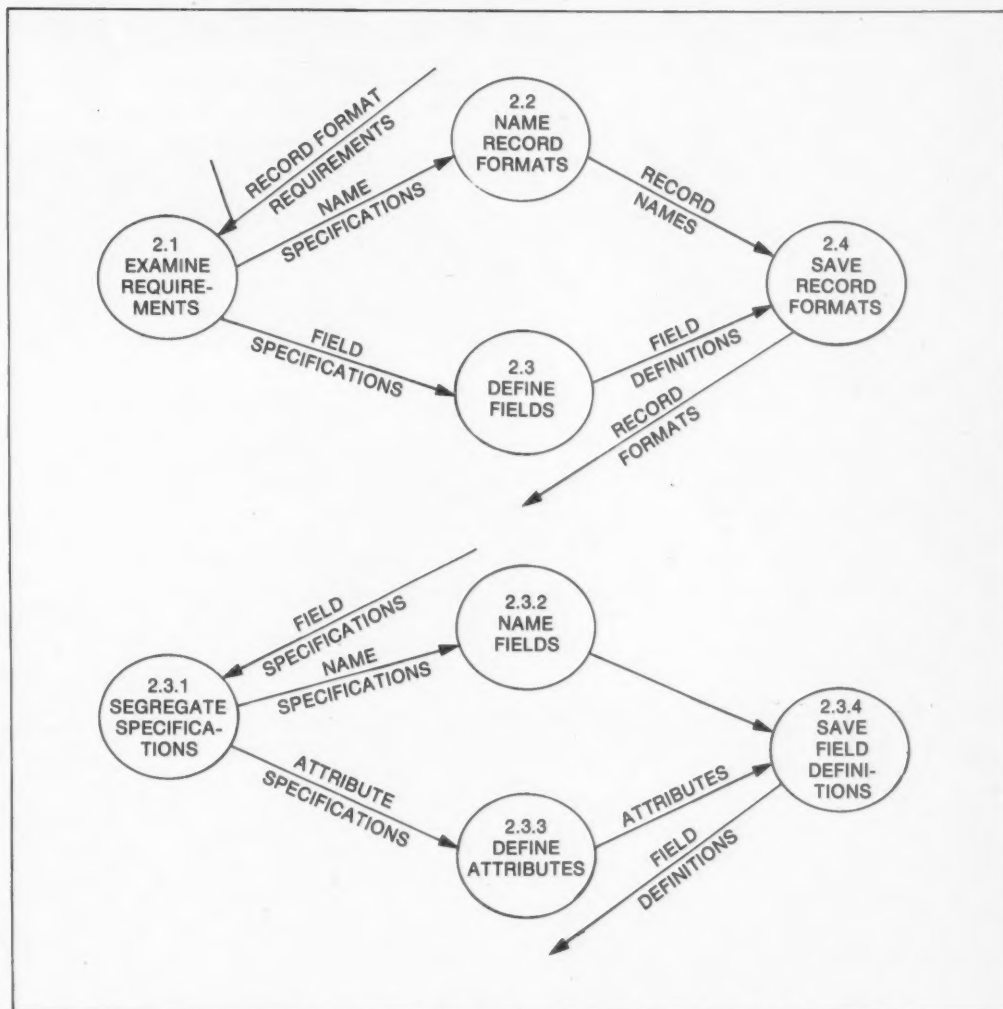


Figure 3. Lower-Level Uses of Process 2 (Create Record Formats) in Sample Data Entry System

for requirements associated with the same categories of users. Figure 5 illustrates the high-level requirement groupings for the sample data entry system.

Using the categories as a guide, the designer arranges the requirements into a manual set. By way of content, the designer wants to provide information to the person who needs it as simply and directly as possible. By way of style (at this level), the designer wants to split conceptual information from reference material. A final consideration is the anticipated volume of the material: a large system may dictate one or several manuals per requirement, while a small system may dictate but one or two manuals for the entire set.

Overlapping needs by the different categories of users may be resolved in several ways.

One, the designer may place the same information in several manuals, the main drawback being the duplication effort. The technique may be desirable, however, in instances where the information — especially conceptual information — must be delivered to dis-

(Continued on In Depth/10)

USERS	REQUIREMENTS
All	Raw data, formatted data, procedures
All except operator	Record formats, edits
All except analyst	Hardware & software basics
Analyst, programmer	Programs
Analyst only	Determining requirements
Programmer only	Programming
Supervisor only	Formatting, setting up procedures
Operator only	Entering data

Figure 5. High-Level Requirement Groupings for Sample System

MANUAL	REQUIREMENTS
Design Guide	Raw data, formatted data, record formats, edits, programs, procedures, determining requirements
Programmer's Guide	Programming
Formatter's Guide	Formatting, setting up procedures
Operator's Guide	Raw data, formatted data, procedures, hardware basics, software basics, entering data

Figure 6. Manual Set for Sample Data Entry System

IN DEPTH

PARA	CONTENTS	STYLE
AO A1 A2	"SECTION 3. FIELD ATTRIBUTES" Instructions for invoking FIELD screen Outline of attributes	Section title Imperative sentences Table: column 1 — attribute name; column 2 — description
B0 B1 B2 B3 B4	"FIELD NAME" Function of field name Restrictions on field name System prompt Examples	Level-1 heading Declarative sentences Imperative sentences Declarative sentence and display Declarative sentences and displays
C0 C1 C2	"SIZE" Function of attribute; system prompt Format of response and restrictions; examples	Level-1 heading Declarative sentences and displays Imperative and declarative sentences, and displays
D0 D1-2	"USAGE" Same as C1-2	Level-1 heading
E0 E1-2	"PROMPT" Same as C1-2	Level-1 heading
F0 F1-2	"RANGE" Same as C1-2	Level-1 heading
EXAMPLE: C0-2 SIZE The size attribute specifies the number of screen positions required for the field. The following prompt solicits the size attribute: <p style="margin-left: 40px;">FIELD SIZE —</p> Specify the field size as an integer in the range 1-32. Leading zeros are not required. The following example specifies a field size of 12: <p style="margin-left: 40px;">FIELD SIZE 12</p> The following examples both specify a field size of four: <p style="margin-left: 40px;">FIELD SIZE 4</p> <p style="margin-left: 40px;">FIELD SIZE 04</p>		

Figure 7. Outline of Formatter's Guide for Sample System

(Continued from In Depth/9)
parate categories of users.

Two, the designer may place common information in one manual or another. The drawback here is that users may be required to access manuals that con-

tain information they do not need, although good organization of the manual may alleviate the problems.

In the sample data entry system, the designer may very well call for eight manuals — one for each user group

with separate requirements. However, such an arrangement in this system would lead to short, disjointed documents. The designer, therefore, taking into consideration the varying capabilities of the users (especially those of analyst vs. operator), divides the information into a set of four manuals, as shown in Figure 6.

At one end, the design guide contains all the information, and only that information, needed by business analysts. At the other end, the operator's guide contains all the information, and only that information, required by operators. Programmers and supervisors must use the design guide for conceptual information and the operator's guide for the hardware and software basics. Conceptual information on raw data, formatted data and procedures appears in both the design guide and operator's guide.

The designer next breaks each man-

ual into sections. Depending on the scope of the documentation effort and the availability of resources, the chief documentation analyst/designer may at this point divide the work among several senior writers.

In proceeding to this more detailed level, the designer must examine the more detailed requirements associated with the manual. In the example, the designer of the formatter's guide uses as input the requirements for processes 2 ("Create Record Formats") and 4 ("Set up Procedures"). Taking into consideration the length and complexity of the information that must be presented, the designer develops the outline shown in Figure 7.

The designer breaks the sections into subsections and the subsections into lower subsections if need be. Each level of design should be reviewed and revised before proceeding to the next.

At the lowest level, the designer defines the subsection as to content and style. The design is quite specific: each paragraph, table and figure in the subsection is described; examples are given as appropriate.

For the sample data entry system, the designer of the formatter's guide breaks down Section 4 (Field Attributes) as illustrated in Figure 8.

Finally, Writing

If the analysis and design phases are thorough, the actual task of writing should go quickly and routinely. The work involved consists mainly of gathering details of information and putting down words using accepted conventions. Conceptual material may present some difficulty and should perhaps be relegated to senior writers. As problems arise, the writers may fall back on the designers for solutions.

Doubtlessly, many writers will greet this article with cries of "formula writing," conjuring up visions of dime novels, hack political speeches and form letters, their objections centering in the thesis that the creativity required to write software manuals precludes discipline. If nothing else, however, this article has demonstrated the possibility of discipline through a structured methodology. Developing and applying the methodology in individual writing shops will not be easy work, and it is here that the real objections will probably lie.

The effort involved in developing and applying a methodology does

(Continued on In Depth/12)

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SECTION	REQUIREMENTS
1. Preparation	Processes 2.1 (EXAMINE REQUIREMENTS) and 2.3.1 (SEGREGATE SPECIFICATIONS)
2. Record Maintenance	Processes 2.2 (NAME RECORD FORMATS) and 2.4 (SAVE RECORD FORMATS)
3. Field Maintenance	Processes 2.3.2 (NAME FIELDS) and 2.3.4 (SAVE FIELD DEFINITIONS)
4. Field Attributes	Process 2.3.3 (DEFINE ATTRIBUTES)
5. Procedures	Process 4 (SET UP PROCEDURES)

Figure 8. Design Specification for Section 4 of Formatter's Guide

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1. Operators must be continually aware of and monitor which system "owns" or controls each device. This distracts them from other, more productive activity.
2. As a MANUAL process it is subject to human error.
3. Because it is difficult to keep track of which system has which device, and whether or not it is allocated, a device is often idle when it could be used to satisfy another, waiting, request. This wastes the utility of a valuable resource for which you are paying good money. It also tends to impede your overall throughput.
4. On the other hand, if a TAPE device is inadvertently allowed to be accessible to MORE THAN ONE system, then jobs in different systems may simultaneously be allocated to the SAME TAPE DRIVE. This can result in a number of serious conditions, including:
 - a. One or all of these jobs may ABEND. This creates idle users, lost production time, and unnecessary reruns (i.e., confusion).
 - b. An input (history) tape might be overwritten.
 - c. Data written by one or more of the programs might be lost or jumbled. This garbled data may not be immediately discovered, and might not crop up again until months later—when you least expect it.
5. For MOUNTABLE DISK, problems arise if a system attempts to mount a different volume on a DISK DRIVE which is actually allocated to users in other systems. In this case, one or more of the jobs will need to be CANCELED to resolve the situation—a practice which (as noted earlier) hurts production and leads to unhappy users.
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2. Your systems will run more smoothly and efficiently, with fewer user and operator headaches. The substantial burden of co-ordinating inter-system device usage is lifted from their shoulders.
3. Your throughput may be increased—this is the direct result of decreased operator interaction and improved utilization of your TAPE and MOUNTABLE DISK resources. Responsibility is returned to the "system" where it belongs.
4. You may actually be able to eliminate TAPE drives—more likely you can defer upcoming additions.
5. Because of operational difficulties, many installations currently avoid MOUNTABLE SHARED DISK devices, or use them only on a very limited basis. With MSM, you may NOW be able to start using them (or use them to a far greater extent). This could allow you to reduce your overall DISK requirement—or perhaps permit deferral of upcoming acquisitions.

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- **MSM USES ONLY AN INSIGNIFICANT AMOUNT OF ADDITIONAL OVERHEAD.**
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IN DEPTH

(Continued from In Depth/10)
seem overwhelming. In the past, writers have performed some of the analytical and design activities mentioned in this article, but the efforts have been largely individual and informal. Certainly, they were not carried out to the detail recommended here. At every turn, the supervisor or writer will be tempted to slip out of analysis or design mode and start putting down words.

Whatever the objections, the simple

fact remains that the present system of attracting and retaining "good" writers is breaking down if, in fact, it ever worked well at all. An adequate supply of experienced writers — or programmers with a flair for writing — does not exist, while development of entry-level persons into experienced writers depends almost entirely on individual efforts. The net result for most shops is insufficient, inferior and uneven documentation.

While a structured methodology

presents difficulties in its development and hardships in its application, it forces significant benefits. The more experienced members of the writing staff work on the tasks requiring the most knowledge, skill and creativity. The less experienced members of the staff, it is true, must perform the more routine duties, but by doing so learn the craft.

The writing staff works in defined processes, proceeding from the general to the specific, from top to bottom.

With thorough work and reviews at all phases of development, problems are pinpointed and resolved at the earliest possible time. Misplaced and redundant information does not find its way into draft form. Questions concerning style are settled before, not after, the writing.

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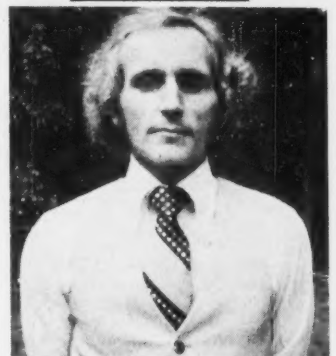
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Robert Perron has more than nine years' experience in software documentation as a technical writer for computer manufacturers and software vendors in the Boston area.

Most recently, he was an analyst/writer for DBMS, Inc., Oak Brook, Ill., a full-service consulting firm specializing in data base and teleprocessing software. He also runs his own software documentation consulting business, Softalk of Salem, N.H.

Through most of his career, Perron worked mainly in an independent, unstructured mode, but often felt that the writing process should be analyzed and defined, especially to aid the development of entry-level personnel. His thoughts jelled recently at DBMS while he was studying and applying structured techniques for the development of applications systems.

Perron's future plans include the development of a writing methodology seminar and a textbook on the subject.

He holds a B.S. degree in education from Fordham University and an M.S. in journalism from Boston University.

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The hard fight for software protection...



At Stake: Competition, Growth, Survival

By Martin A. Goetz

Software protection is necessary not only to safeguard current investments and business assets but also to ensure the survival, growth and health of every company concerned with software, most notably the software product companies.

Software product companies are investing millions of dollars in new products and product enhancements. They license or lease copies of pro-

on the software they have developed not only for their livelihood but also for their survival and competitive health.

Users, too, have a lot of money invested in software. Worldwide, its value is in the \$50 billion to \$100 billion range. And much of it is competitive.

Software protection, then, surpasses the subtle debate over whether the copyright law is the preferred form of protection or whether the patent law conflicts with trade secret law.

Software protection entails:

mechanisms have been set up to foster competition. The patent system, both in the U.S. and worldwide, was designed to stimulate innovation and competition.

The trade secret law was instituted to protect secrets from competitors as well as from employees who might want to sell secrets or use trade secret information, and the copyright law was developed to prevent competitors from making copies of an individual's or organization's property.

Companies must also be protected from unauthorized users or from potential buyers who might copy software. Today, there are several means for this protection. Legal protection is afforded by the copyright and trade secret laws as well as by contracts between buyer and seller.

An additional deterrent against unauthorized use is a physical or electronic method through which the software developer can restrict software use to a particular computer or user. Electronic protection can be accomplished by:

- Tying the program into a specific CPU.
- Providing a special key to a user for unlocking or unscrambling the software.
- Having expiration dates embedded in the software so that it will self-destruct after a given period of time.
- Implanting self-destruct mechanisms in the software so it will not work properly if modified.

Unique Software

The "better mouse trap" has been the driving force behind many successful companies, both in and out of the computer field. Innovation, inventions and new technology are costly and can be important company assets. The patent system — in existence in the U.S.

since 1790 — was enacted to stimulate competition by providing for the ownership of inventions.

The question of whether the patent system should be applied to software and software companies is important to the health of the software industry. It is important to protect creativity, for it is expensive, requiring research and investments. Such investments may not be forthcoming if its fruits are not protected.

The patent system provides for the patentability of "unique machine processes." Many people in the computer industry contend that "a machine process" patentable when implemented in hardware should be equally patentable when implemented in software. There is no reason to believe that patents are in the domain of hardware companies only.

Whatever the legal method, innovations should be protected. There is no reason to believe they belong in the public domain.

Theft, Destruction

Other threats to software are theft, tampering, destruction and obsolescence. It is not only the value of the software that we want to protect; we also must make sure the software is not tampered with or destroyed.

Let me clarify this. A user may or may not be concerned if a copy of his software is made. In fact, many companies in the past put their software in user group libraries or gave it away. However, a user certainly should be concerned that his software is protected against tampering or destruction. Surely, most of today's corporations and governments would come to a standstill if their software suddenly didn't work or was destroyed.

Destruction can be prevented in various ways. (Continued on In Depth/17)

Does a software developer deserve protection for his efforts? What form should that protection take? Patents? Copyrights? Trade secrets? And what difference does all this make for the user? Here are two perspectives on this growing controversy — one from the law, one from industry — plus a look at the proposed revisions to the 1976 Copyright Act.

grams around the world and engage in confidential research and development that can be classified as high technology.

They employ hundreds to thousands of people, have revenues in the millions and do business in an intensely competitive world.

Annual revenues from independent software product companies are estimated at close to \$1 billion. IBM alone has annual software product revenues of more than \$1 billion. Most of these businesses are completely dependent

- Protecting software from competitors.
- Protecting software from unauthorized use and copying.
- Protecting the unique software process or invention.
- Protecting software from employee theft, destruction and obsolescence.
- Protecting software against unfair competition such as bundling, tie-ins and unfair pricing.

Protection from competitors should be a prime goal of software protection. Over the years, various laws and legal

Preserving Protection Under Copyright Law

By Reed C. Lawlor

Program proprietors have often based payment for their programs on the use made of them by lessees and purchasers. The right to charge for programs on that basis was preserved under the copyright law that went into effect Jan. 1, 1978.

But implementation of a proposal by the Commission on New Technological Uses of Copyrighted Works (Contu) could take away that right.

Later in this article, I will offer an alternative proposal that would preserve this right on a federal basis instead of under state law. But first, some background.

The 1976 Copyright Act went into effect Jan. 1, 1978, after 45 years of effort (some say only about 20 years) to modernize the copyright law. Such modernization was postponed in 1976 with respect to computer technology by the inclusion of the following section:

§117. Scope of exclusive rights: Use in conjunction with computers and similar information systems. Notwithstanding the provisions of sections

106 through 116 and 118, this title does not afford to the owner of copyright in a work any greater or lesser rights with respect to the use of the work in conjunction with automatic systems capable of storing, processing, retrieving, or transferring information, or in conjunction with any similar device, machine or process, than those afforded to works under the law, whether title 17 or the common law or statutes of a State, in effect on December 31, 1977, as held applicable and construed by a court in an action brought under this title.

Some parts of the old law and some parts of the new one apply to software. Contu, which was appointed by President Ford on July 25, 1975, was charged with modernizing the copyright law with respect to computer technology.

Under section 117, the common law has continued to apply to computer technology so far as use of a copyrighted program in conjunction with computers is concerned.

But common-law rights to listings and copies were abolished. And there may be some doubt as to whether machine-readable versions of programs are protectable under either law.

The overall effect of the Contu proposal, if adopted, would be only to weaken the rights of

program proprietors.

After its three years of work, Contu has made a proposal for new legislation to be considered by Congress. This proposal and its purpose were set forth in Contu's final report, dated July 31, 1978. This report brought bad news and possibly very little good news to the software industry.

The Contu proposal, if adopted, would provide weaker protection than the present law to proprietors of computer programs. But strong legislation is needed. I will make some proposals different from those of Contu which, if adopted, will provide strong protection for the rights of proprietors of computer programs. As we will see, from the standpoint of the program proprietor, it may be better to retain the present law than to adopt the Contu proposal.

Many people maintain that some of the uncertainties about protection of computer programs under the old 1909 copyright law have been preserved under the new 1976 law. The Contu proposal would not remove all these uncertainties and would in fact create new ones. It would also create some new uncertainties that would be detrimental. (Continued on In Depth/30)

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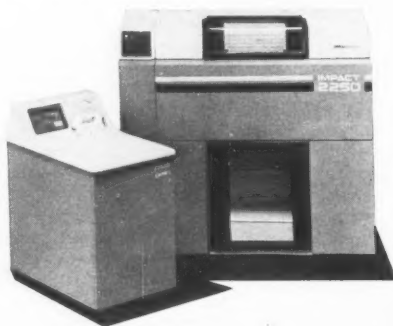
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IN DEPTH

(Continued from In Depth/15)
ous ways. The most common involve programming tools such as librarian systems, software locks, program and data encryption techniques, audit programs and the like. There are also physical measures such as keeping backup tapes, storing duplicate programs in physically distant sites and so on. Finally, there are ways to build software so that obsolescence is minimized.

Unfair Competition

It is a tribute to the software product industry that it was able to emerge as a viable force in the computer industry, with the barriers to entry that existed in the 1960s and, to some extent, still exist. Not only was software bundled with hardware, it was also put in the public domain by the hardware companies.

The protection of software clearly relates to how hardware companies structure their software/hardware development, marketing and pricing. They can manipulate these relationships. In fact, the hardware manufacturers are primarily responsible for the current confusion concerning the degree of protection that existing U.S. and international laws currently provide.

Vital Definition

What is software? As far back as I can remember, there has been a great deal of discussion, debate and confusion concerning that question. A universally accepted definition of software is vital to the industry. Such a definition will affect software's legal status in the U.S. and around the world.

The question "What is software?" grew louder and more persistent in the mid- to late 1960s. Today, the question is still being asked:

- By financial people when analyzing a corporation's assets and liabilities.
- By state and federal tax authorities when viewing new revenue sources, especially sales tax and personal property taxes.
- By the IRS when considering the investment tax credits question.
- By the Copyright Office when deciding whether software comes under its jurisdiction.
- By the Patent Office when deciding whether the inventive concepts in a program constitute patentable subject matter.
- By lawyers when drawing up con-

tracts.

- By judges when deciding cases involving ownership of software.
- By the State Department when licensing and exporting high technology to the Eastern Bloc countries.
- By the Justice Department in the current IBM antitrust case.

Let me give my definition: *Software is a machine component of a computer system, similar to a computer circuit or a terminal component or a disk component.*

This software machine component can be in source form (the source program) or in machine form (the object program).

Some software product companies today view themselves as manufacturers of software. They have all the characteristics of manufacturers, yet they do not share in many of the legal protection mechanisms available to other manufacturers, and in particular, to computer hardware manufacturers. If software is viewed as just another ma-

chine component of a computer system, many of the problems in defining software go away. What also goes away is the need for new laws to protect software.

Given the chance, I would apply all the existing laws to software and to software products in particular. In the U.S., this would mean that software products would be eligible for patent and copyright protection and for investment tax credit. In addition, they

(Continued on In Depth/18)

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(Continued from In Depth/17)
would be subject to sales and personal property taxes. And finally, software product development could be capitalized.

The question of whether existing laws are applicable to software is presently being argued in the courts. While the debate goes on, let's briefly review the status of software protection through the patent, copyright and trade secret laws.

I have followed the software patent

controversy since 1965, when I first applied for a software patent. In my opinion, the Patent Office is solely responsible for the current controversy regarding whether an "inventive machine process" implemented in software is patentable subject matter.

To begin with, in 1965 that office issued a set of proposed guidelines for filing software patent applications. Unfortunately, a new patent commissioner suddenly withdrew those guidelines in 1966.

In 1969, the Court of Custom and Patent Appeal made a clear and definitive software patent ruling in the Prater-Wei case. Based on that decision, a new commissioner opened the door for patenting "software related inventions." Starting in 1970, more than 100 patents were issued — including one of mine.

The door closed in about 1972 when the Benson patent application was appealed to the Supreme Court. This patent — which contained a questionable

invention — was the first of three cases that went before the Supreme Court. None of these three cases was representative of "inventive machine processes" that software product companies might desire to patent.

The second case was the Johnston patent for a banking application. The Supreme Court said that it "wasn't novel" and set the stage for the third Supreme Court case.

On April 25, 1978 the Supreme Court of the U.S. heard arguments — for the third time — on the question of "the patentability of software." In that case (Flook vs. Parker), I participated in the preparation of two amicus briefs presented to the court that argued *not* for the Flook patent, which was an Atlantic Richfield oil refinery process control system, but for the general question presented to the court. That question was: "Is a mathematical algorithm, conventionally implemented in a general-purpose computer, patentable subject matter?"

Basis for Argument

We argued several things:

- That computer programming is not necessarily the conventional implementation of mathematical algorithms.
- That software is a machine component of a computer system.
- That the software products industry wants to protect a unique machine process that can be implemented in software.
- That machine processing systems which are patentable when implemented in hardware should be equally patentable when implemented in software.
- That hardware and software are equivalent and that the actual choice of implementation is an economic choice — not a technological one.
- That when people speak of software

(Continued on In Depth/20)

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The pallbearers.

Despite the challenge of high-powered, low-cost minis, the most notable group trying to bury remote computing is formed by the remote computing companies themselves!

Some of the largest remote computing companies (Tymshare, NCSS, ADP and Rapidata) have started selling minicomputers to their remote computing customers.

Running scared?

We suggest that these companies were so shook up by the low-cost mini (as compared with the high cost of remote computing) that they rushed to cover their flanks. In doing so, they forgot where they came from. They forgot why remote computing has grown into a multibillion-dollar industry over the last ten years.

Remote users don't want computers.

Though there are exceptions, the largest companies are the heaviest users of remote computing services. They can buy computers like most companies buy typewriters. But many of their users won't. Why?

The on-site problem.

Remote computing users invariably want to avoid problems that automatically come with putting computers on-site. Hardware selection, facility development, installation, operation, maintenance, system analysis, programming, communications, security, recruiting and training are just some of the problems that accompany a decision to put a computer on-site... even if it is a mini (and don't let the mini marketers tell you otherwise!).

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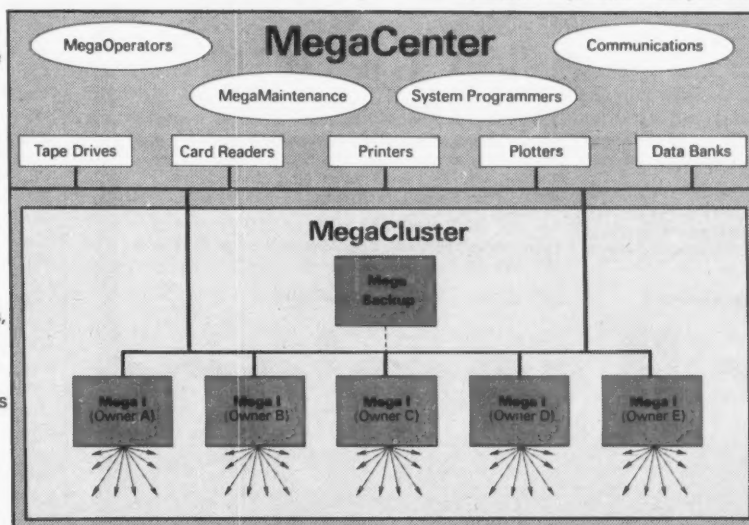
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IN DEPTH

(Continued from In Depth/18)
ware as being "engineered," they are not just using a buzzword or promoting their own philosophy. Complex software is a high technology. Large software systems are constructed using the same disciplines and processes used in the engineering of hardware.

Our point was this: Under the patent law, we are trying to protect the underlying unique machine process, such as a process of sorting data or a process of optical scanning. And such pro-

cesses should be patentable subject matter — whether they are implemented in hardware or in software.

In July 1978, the Supreme Court wrote its opinion on why the Flook application was not patentable. The Supreme Court rejection was assumed to be a narrow decision and was considered very favorable to the patentability of software. The decision signalled that inventive software processes are patentable software matter.

Unfortunately, the Patent Office is

still reviewing that option and has not officially changed its position on the patentability of software. Many in the industry and in the government expect the Patent Office to reverse its current ban on software patents.

While the Patent Office bans "software implemented patents," this is not the case for "software/hardware implemented inventions" or inventions where it is not clear how the "inventive machine process" will be implemented.

Yet two patents granted by the Patent

Office in the last several months and publicized in *The New York Times* appear to be "software implemented." Whether they are or not, why should the Patent Office discriminate?

Copyright Law

Many computer companies have been copyrighting their source and object programs since 1964. The Copyright Office, while accepting such programs, stated that "there might be two grounds for doubt about the registrability of programs. . . ." It stated that computer programs "might not be within the concept of 'writings of an author' and machine-readable versions might not be 'copies' of the program."

The Copyright Office's decision to copyright computer programs has never been challenged. In 1967, when Congress was considering bills to revise the Copyright Act of 1909, the Senate proposed the establishment of the National Commission on New Technological Uses of Copyrighted Works (Contu) to study and compile data on reproduction and use of copyrighted works of authorship in computers. It was not until 1974 that the bill was enacted by Congress and Contu was established. On July 27, 1975, the commissioners were selected for a three-year term. During the next three years, many associations, companies and interested parties testified before Contu.

Basically, our position was that many companies have been using the copyright system for many years to protect against the unauthorized copying of programs and that these companies want to continue to use the copyright system.

However, other companies were using trade secret and patent law and did not wish to see the copyright law strengthened to the detriment of either of these other forms of protection.

Our position was simply that the copyright law is currently applicable to protecting computer programs and that it would be desirable to "explicitly state it" to remove any question on that subject.

On July 31, 1978, the final report was sent to Congress with the recommendations of the Contu commissioners. Following is their recommendation concerning the "program copyrightable issue" which represented one aspect of their charter: "The new copyright law should be amended 1) to make it explicit that computer pro-

(Continued on In Depth/23)

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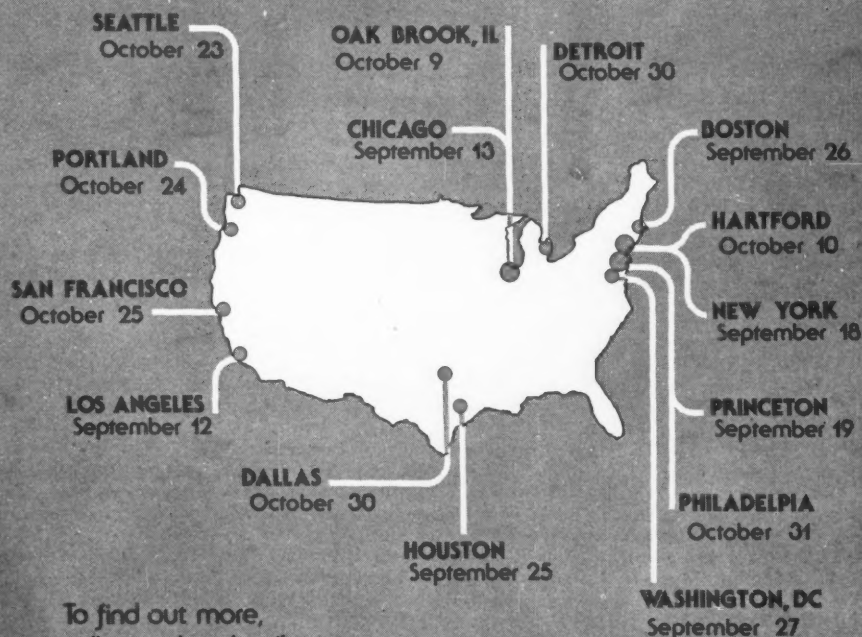
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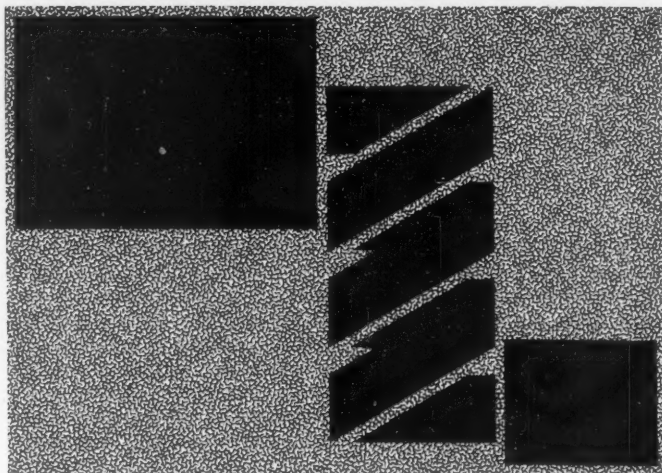
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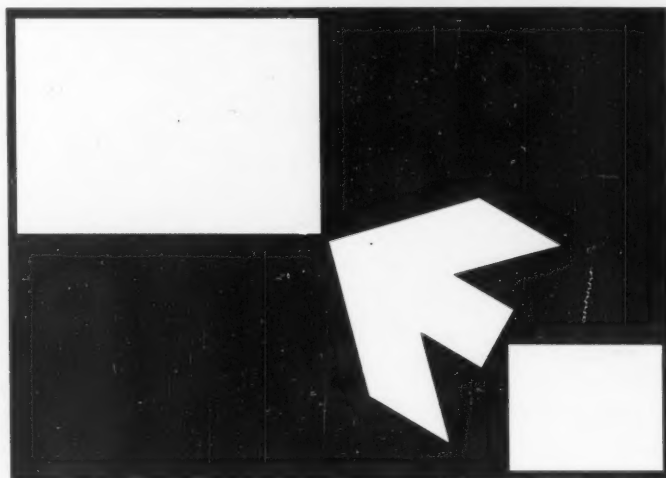
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AT STAKE: COMPETITION

IN DEPTH

(Continued from In Depth/20)

grams, to the extent that they embody an author's original creation, are proper subject matter of copyright; 2) to apply to all computer uses of copyright programs by the deletion of the present Section 117; and 3) to assure that rightful possessors of copies of computer programs can use or adapt these copies for their use."

This conclusion was consistent with the position of many witnesses who discussed the need for such "copying" protection and is consistent with the position of other countries and international organizations that studied the problem.

The Contu report stated: "The conclusion of the commission is that the continued availability of copyright protection for computer programs is desirable. This availability is in keeping with nearly two centuries' development of American copyright doctrine during which the universe of works protectable by statutory copyright has expanded along with the imagination, communications, media and technical capabilities of society."

The report was also very sensitive to the needs of companies that depend on other forms of protection, notably trade secret, patent and unfair competition laws. It pointed out the basic differences between those various forms of protection. However, the report stated that copyrighting was the preferred form of protection because the others could inhibit the dissemination of information and restrict competition.

The report then compared copyright, patent and trade secret law using 13 criteria. The accompanying table is a summary of Contu's conclusions on why it believed that copyright law is the most important of the various forms of protection.

Contu also indicated its awareness of the fact that patents, trade secrets and copyrights do not conflict with each other when it stated: "That the words of a program are used ultimately in the implementation of a process should in no way affect their copyrightability," and "The availability of copyrightability for computer programs does not, of course, affect the availability of trade secret protection."

Contu also had a position on object code and transliterations. The commission stated that:

1. The conversion of a source program into object code constitutes the making of a copy, since no additional logic has been added to the program. Therefore, the object code should be protected by virtue of the copyright in the original source program.

2. The conversion of a program to another source language should be considered the making of a derivative work and the translation should be protected under copyright.

So, the Contu recommendations, if enacted, will revise the copyright laws with the explicit statement without any effect on the patent and trade secret laws. If the commission's recommendations are not enacted, most law-

General Considerations	Copyright	Patent	Trade Secret
National uniformity	Yes	Yes	No
Protection effective upon	Creation work	Successful prosecution of application	Entrance into contractual relationship
Cost of obtaining protection	Nil	Moderate	Moderate
Term of protection	Life plus 50 years or 75 years	17 years	Possibility of both perpetual protection and termination at any time
Cost of maintaining protection	Nil	Nil	Significant
Cost of enforcing rights against violators	Moderate	Moderate	Higher
Availability of:			
(a) statutory damages	a. Yes	a. No	a. No
(b) attorney's fees from infringers	b. Yes	b. Yes	b. No
Protection lost by	Gross neglect	Unsuccessful litigation	Disclosure
Software Considerations, Including Effects of Subcommittee Proposals			
Consistency with other copyright areas	Yes	No	No
Availability of protection mechanism for some programs	Yes	Unclear	Yes
Universal availability of protective mechanism for all programs	Yes	No	No
"Process" protectable	No	Yes	Yes
Suited to mass distribution	Yes	Yes	No

Characteristics of Protective Mechanisms

yers believe that the current copyright law will still be sufficient to protect program "writings."

As I mentioned earlier, I believe that a computer program is a component of a computer. There is nothing inconsistent with believing that the copyright law should protect a computer program even if that program is a component of a computer system.

In 1978, the use of the copyright law to protect against illegal copying of machines and machine components was raised by Intel Corp. Intel wanted to protect the illegal copying of its microprocessors and peripheral chips and attempted to register its 8755 erasable programmable read-only memory with the Copyright Office. In testimony before a congressional hearing, Intel's general counsel stated that the company had invested \$28 million in its chip technology and a competitor could develop a full set of masks to duplicate that chip in 30 days at a cost of \$20,000 to \$30,000. As you may have read, there is some disagreement among chip manufacturers as to whether "chips" should be protected by the copyright laws.

Applied Data Research, Inc., the Association of Data Processing Service Organizations, the Computer & Business Equipment Manufacturers' Association and others are in full agreement with the position of Contu, which is that the copyright law is applicable and that only clarifications to that law are required. However, many organizations still do not want to use the copyright laws and/or the patent law. Many believe that trade secret law is their best protector.

Trade Secret Law

Many attorneys believe that trade secret law is not only adequate but the preferred vehicle for protecting software today. However, because there is no federal trade secret law and such laws are developed state by state, many in the legal profession do not believe that trade secret law is completely adequate to protect software.

Also, in most states, under trade secret law an organization must declare that it is using trade secret law as its "mode of protection" and it is, therefore, prohibited from using copyright or patent law.

While many believe that trade secret is a viable method for software protection, there is little in the way of case law that will convince the lawyer who opposes trade secret that it is a viable method. Also, since programs are licensed around the world, the lack of a consistent law makes trade secret, in my opinion, questionable if a company depends on it as the only form of protection.

Contractual Agreements

No matter what laws a company believes will protect its software property, it should not overlook a strong contractual agreement between organizations and between individuals. Agreements should specifically spell out all restrictions placed on the property if it is to be used by another organization. This would include clauses covering copying, usage, confidentiality and safekeeping. And software should not be sold, because the courts often disallow restrictions put on "a sale." The software should be leased or licensed.

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(Continued on In Depth/27)

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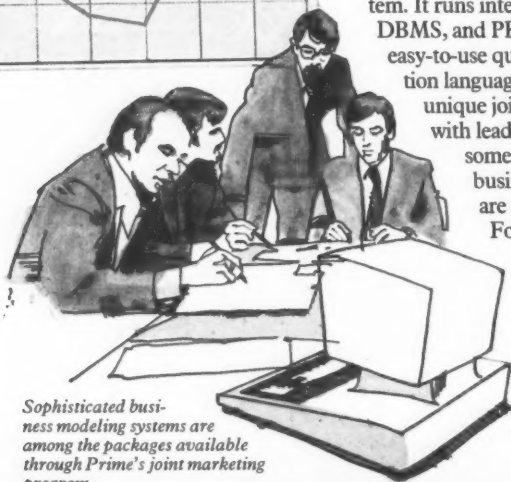
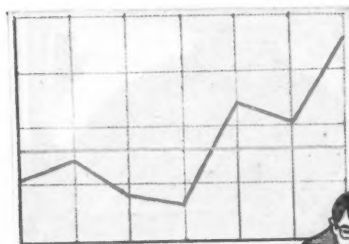
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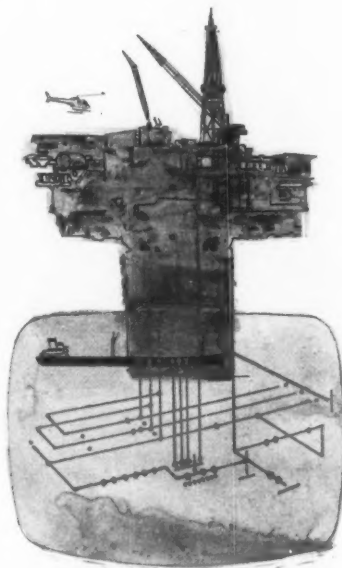


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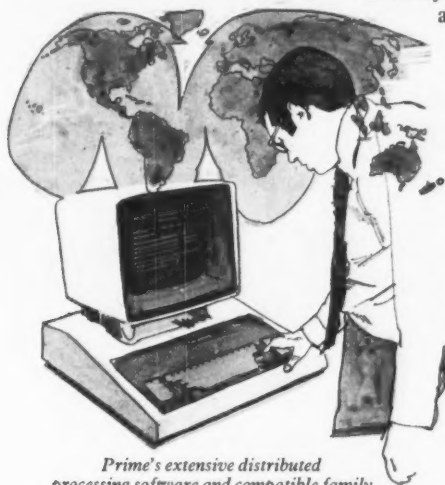
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match the right Prime system to your present needs, upgrade to a 750 when the time comes, and still fully protect your valuable investment in software. And you can use your 750 to develop applications software to run on other Prime systems.

One notable exception

With all that it can do, there's one thing you can't expect to turn over to the 750: a big chunk of your data processing budget. The 750 is priced substantially lower than mainframe computers of comparable capabilities, it's a lot less expensive to install, operate, and support, and you can get prompt delivery. All of which can make you a lot more versatile in allocating your financial resources to get your job done.

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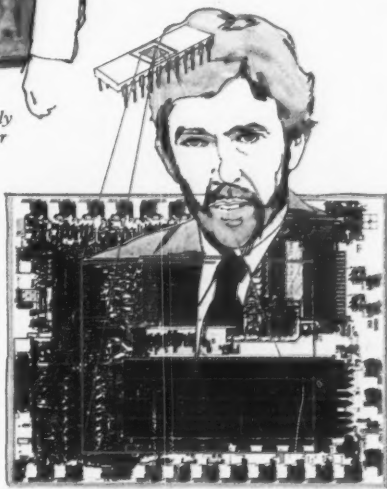


Prime's extensive distributed processing software and compatible family of computers let you put computing power where it's needed.

and NASTRAN for finite element analysis, DIS/ADLPIPE for piping system design, and SCI-CARDS for printed circuit board layout and routing. Besides these joint marketing packages, there are dozens of others available through third parties and PULSE, the Prime Users Library.

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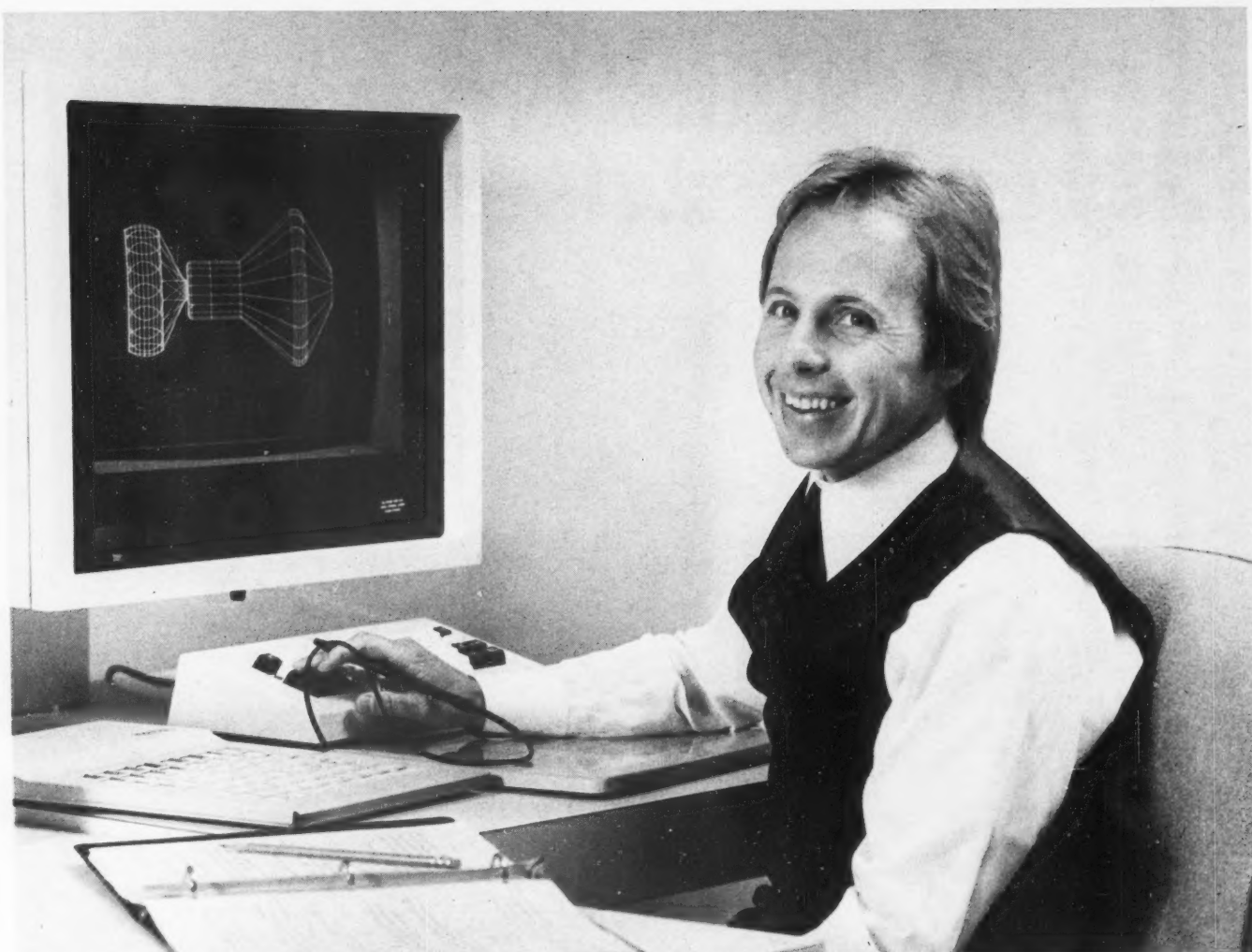
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IN DEPTH

(Continued from In Depth/23)

ber of state and federal laws have been enacted in the U.S. to protect small companies against unfair competition. These laws range from unfair advertising laws to antitrust laws.

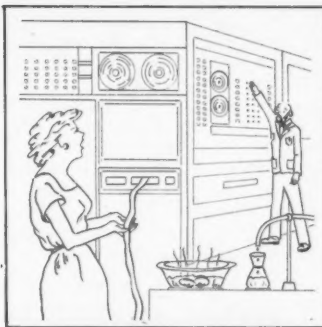
In between these two extremes are laws against tie-in sales, incremental pricing, predatory pricing, and other pricing schemes that the courts view as unlawful. For those companies selling software products or a software service, these laws are applicable for protection.

Physical Protection

Much has been written about the physical protection and security of software, data and the like, as well as the catastrophes that have hit companies without such protection. Today, copies of such information are placed in vaults and mountain hideaways. This is a common practice.

Fireproof vaults and data center security measures are also used at most progressive installations. That was not the case 10 or 15 years ago.

So, if yours is one of the installations that does not physically protect its software, or if you do not have a formalized plan, now is the time to begin.



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Each year there are more and more computerized utility systems to help protect software. There are librarian-type utility programs to permit only authorized access to programs and to document changes made to programs. There are testing systems to reduce computer errors; back-up procedures for restarting jobs; encryption programs and software locks to restrict access to data and programs; and audit programs to confirm the completeness and accuracy of data and programs.

In addition, as we previously discussed, some companies are using the machine-readable serial number to prohibit the use of a copied program on an unauthorized computer. Using this technique, the serial number, which is embedded in a program, is encrypted. The program will not execute properly if run on an unauthorized CPU.

Another form of protection is for the program to check the date that is embedded in the operating system. If it

does not meet a specified date criterion, the program will not execute.

These computerized aids can go a long way to significantly improving software protection.

Protection Against Obsolescence

Current experience shows that software written in high-level languages can survive for 20 years or more. Certainly these languages are independent of the current hardware generation

(Continued on In Depth/28)

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IN DEPTH

(Continued from In Depth/27)
and, depending on the degree of evolution, they may survive indefinitely. However, much of today's software becomes obsolete at an alarming rate.

Software life is very much a function of the original design and the experience of the development team. The disciples of software engineering, structured design and structured engineering believe that the life of a well-designed software system will not only be significantly longer — it will be

significantly more bug-free.

This has been shown to be very true. Literally hundreds of software systems that were soundly developed many years ago are continuously updated and continue to be viable.

On the other hand, the reverse is also true. Poorly developed systems — often quickly programmed to meet an existing and immediate requirement — are often reprogrammed within several years of their original development. Protecting the life and integrity of a

software system is a function of the caliber and experience of the personnel involved.

During most of the 1970s, many of us thought IBM bundling, tie-in and predatory pricing were things of the past. As we all knew, prior to 1970, hardware and software was bundled and unpriced. Today, hardware and operating system bundling (a remnant of the past), software-to-software tie-ins and software-to-firmware tie-ins are with us.

The forecasts for the 1980s are that hardware manufacturers will receive a significant amount of their income from software. IBM and other hardware companies will undoubtedly attempt to dominate this market. And they will attempt to do this by controlling the market and by "selling the solution."

And the solution will be predominantly software tied to firmware, hardware or to other software. IBM must be required to price each piece of software separately and fairly and to provide interfaces.

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Martin A. Goetz is senior vice-president and director of the Software Products Division of Applied Data Research, Inc. (ADR). He holds the first U.S. software patent and is co-author of High-Level Cobol Programming, published in 1977.

Goetz holds bachelor's and master's degrees from the City College of New York.

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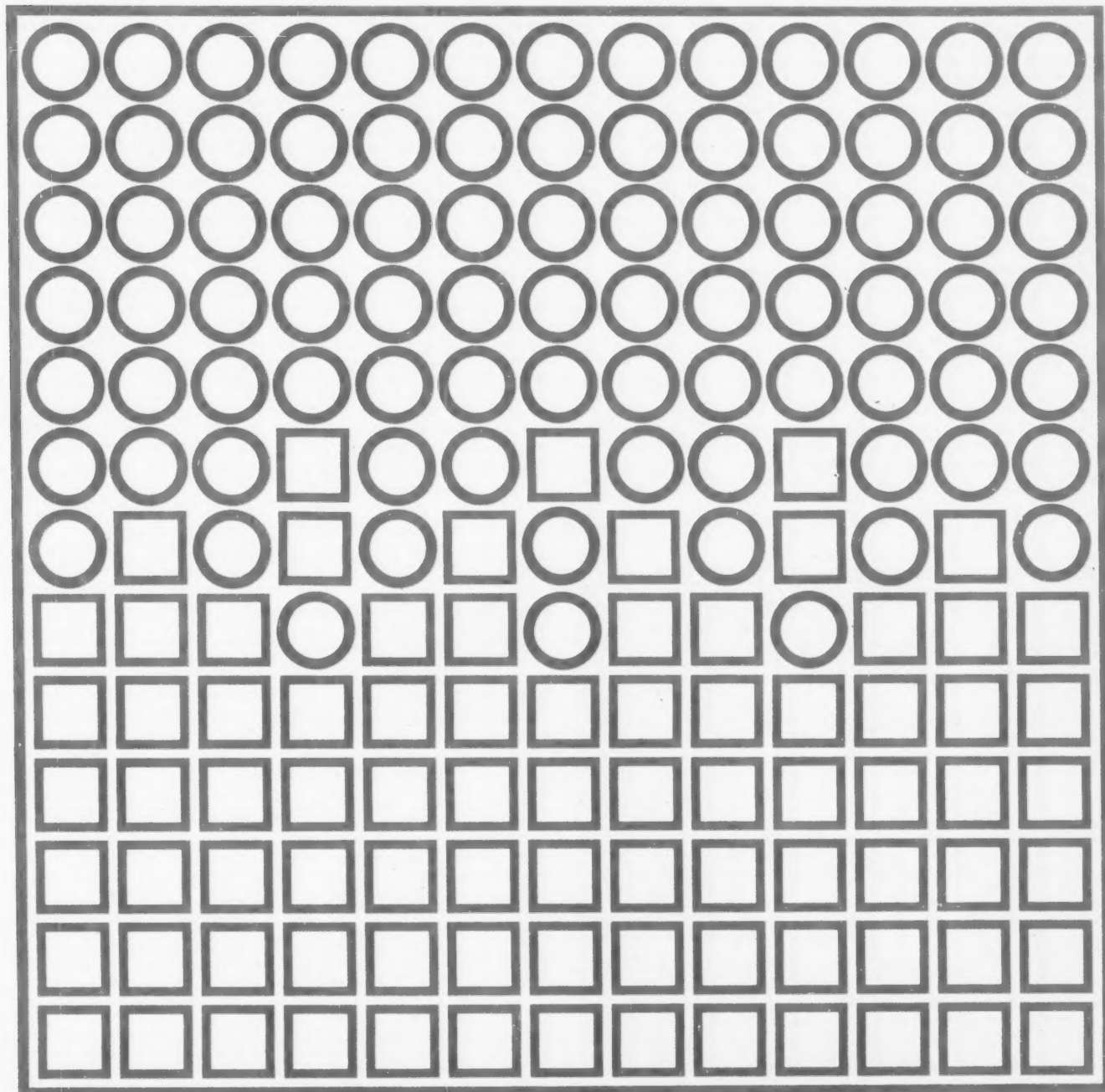
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IN DEPTH

(Continued from In Depth/15)
mental to proprietors of computer programs.

Old Law vs. New

First let me try to summarize the prevailing views under the old and new laws:

1) It is generally agreed that computer programs, at least in written or printed form, are copyrightable under the old law. There is hardly any question that this is also the case under the new law.

2) Some argue that when a program is in a machine-readable form, it is not protected under the old copyright law. But under the new law, programs in machine-readable form are protected, if such protection is constitutional.

3) There is a general belief that making a machine-readable copy of a computer program that is itself in machine-readable form does not constitute copyright infringement under the old law. But it is generally agreed that, except for a constitutional question, making a machine-readable copy of a machine-readable program constitutes copyright infringement under the new law. This should also apply to reading a program into a computer memory.

At one point, Contu seemed to interpret the law to mean that copying of a program into computer memory is a "use" under the present Section 117 (Contu report, Page 30). But it also made a strong statement to the contrary (Contu report, Page 31).

4) There is little question that a proprietor of a computer program had a common-law right to treat the program as a trade secret under the old law and to release the program as such. The proprietor could receive payment in terms of the execution time of the program, as well as on a weekly or monthly basis, or possibly in other ways.

5) But under Section 117, the protection remains almost the same as under the old law so far as program execution is concerned, whatever that is.

Trade Secrets Law

The turmoil created by opponents of program protection under the patent and copyright laws during the past 20 years has forced many program proprietors to rely upon the trade secrets laws.

Under these laws, which vary from state to state, proprietors have received payment for programs on the basis of use, often measured by execution time.

These rights are preserved under Section 117, but another section (Section 301) could erase them if the Contu proposal is adopted.

Rights to control the use of programs may be lost or at least weakened if Section 117 is repealed, unless they are preserved under a revised version of the law. The programming industry may wish to be cautious before deciding whether to climb on the Contu bandwagon.

What program proprietors want most is continued recognition of their right to base payments from buyers or lessees of program copies on the extent of use made of the program by the lessee or buyer.

If such interests could still be protected as trade secrets whether Section 117 is repealed or modified, program proprietors would undoubtedly accept whatever affirmative results would accrue from such change. But if rights that program proprietors already possess are weakened by the repeal or revision of Section 117, they would hesitate to favor such change.

Everyone seems to agree that Section

117 should be repealed as provided for in Section 1 of the Contu proposal (see Figure 1) — if such repeals would not result in loss of presently existing rights.

Good, Bad News

On its surface, it appears that repeal could bring good news to the program proprietor. But repeal or modification could bring some bad news which has been largely overlooked.

I will attempt to show that the good news from Contu is illusory and hence is actually bad news and that therefore the adoption of the Contu proposal would not benefit the programming industry.

The main question here involves the meaning of Section 3, regarding enactment of a new Section 117. In particular, what does it do to the right of the program proprietor to base payment on the extent of use rather than upon a fixed price or total time of possession? We can best determine the meaning of Section 3 by examining the recommendations and statements made by Contu in its report (see Figure 2).

Note the word "apply" in Section I.2 and III. What does that mean? Does it mean "preserve" or does it mean "destroy"? We will see.

Note the presence of Section I.3, which indicates that Contu intends that programs receive less protection than data bases.

But first note the supposed good news. By recommending Section I.1, the commission has rejected the proposition of dissenting Commissioner John Hersey that copyright protection

(Continued on In Depth/33)

Contu Proposal

Contu has proposed to amend the 1976 Copyright Act. It has recommended:

(1) That Section 117 as enacted by repealed.

(2) That Section 101 be amended to add the following definition: A "computer program" is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.

(3) That a new Section 117 be enacted as follows:

§117: **Limitations on Exclusive Rights: Computer Programs.** Notwithstanding the provisions of 106, it is not an infringement for the rightful possessor of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program provided: (1) that such a new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner, or (2) that such a new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.

Any exact copies prepared in accordance with the provisions of this section may be leased, sold or otherwise transferred, along with the copy from which such copies were prepared, only as part of the lease, sale or other transfer of all rights in the program. Adaptations so prepared may be transferred only with the authorization of the copyright owner.

Figure 1

Contu on Usage

The recommendations of Contu concerning computer usage read as follows:

I. **Computer Programs.** The new copyright law should be amended 1) to make it explicit that computer programs, to the extent that they embody an author's original creation, are proper subject matter of copyright; 2) to apply to all computer uses of copyrighted programs by the deletion of the present Section 117; and 3) to assure that rightful possessors of copies of computer programs can use or adapt these copies for their use.

II. **Commissioner Hersey's Dissent.** The Act of 1976 should be amended to make it explicit that copyright protection does not extend to a computer program in the form in which it is capable of being used to control computer operations.

III. **Data Bases.** The Act of 1976 should be amended to apply to all computer uses of copyrighted data bases and other copyrighted works fixed in computer-sensible media by the deletion of its present Section 117.

Figure 2

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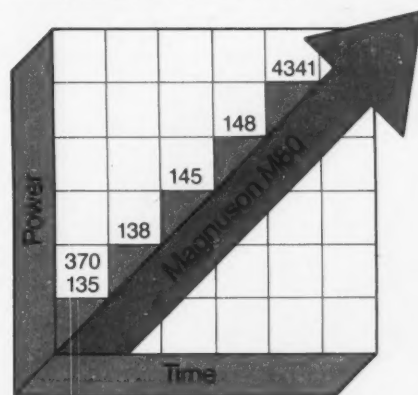
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IN DEPTH

(Continued from In Depth/30)
should not extend to a computer program in machine-readable form.

The commission has also rejected Commissioner Melville B. Nimmer's view that it may be desirable to limit copyright protection (at some time in the future) to only those computer programs that produce works such as literary writings, graphic arts, musical compositions or works of art which themselves qualify for copyright protection. But that should not be a question. The copyright act, even with Section 117 as it stands, already protects programs in machine-readable form. It therefore seems clear that deletion of Section 117 is of no benefit so far as registrability is concerned. Recommendation I.1 probably buys nothing, or whatever is next to nothing, for the program proprietor.

But how about copying into computer memory? Except for the constitutionality question, it appears Contu recognizes that copying into computer memory is an infringement. That could be good news. But is it?

In his masterful work on copyright law (1978), Nimmer distinguished between copying onto tape or disk on the one hand and copying into a computer (I.2) on the other. He said that the former is not a use under Section 117, but seemed to imply that the latter is. Accordingly, Nimmer implied that copying into a computer memory is not an infringement under the new law, but may or may not be under the old law. And this seems to be Contu's view.

Now, examine the underlined portion of Section I.3. This recommendation has been made by Contu to make sure that the lawful possessor of a copy of a copyrighted computer program would have a lawful right to use the program in a computer, even if forbidden to do so by the owner of the copyright of the program.

But if the possessor is to have a right to use it in a computer, by implication he has a right to input it into computer memory. So, what good Contu seems to give the program proprietor with one hand under Section 1.1 and I.2 with respect to the general public, it takes away with the other hand under Section I.3 as to lawful possessors.

In other words, an unlawful possessor who copies into a computer memory would be an infringer. But a lawful possessor would have a lawful right to copy and use a program in a computer regardless of the wishes of the program proprietor.

If you have any doubt that it is the intent of Contu that the program proprietor from whom possession of the program was obtained would have no right to prevent the possessor of the program from using it, consider what Contu itself said on Page 31 of its report:

"Because the placement of a work into a computer is the preparation of a copy, the law should provide that persons in rightful possession of copies of programs be able to use them freely

without fear of exposure to copyright liability It is easy to imagine . . . a situation in which the copyright owner must desire, for good reason or none at all, to force a lawful owner or possessor of a copy to stop using a particular program. One who rightfully possesses a copy of a program, therefore, should be provided with a legal right to copy it to that extent which will permit its use by that possessor. . . ."

Now, it is not at all self-evident from Section 3 of Contu's legislative pro-

posal how this goal (to assure the possessor of a right to use) is accomplished by the proposed revision of the law. The proposal itself says nothing about the right to use without the consent of the program proprietor.

I suggest that, at the very least, if Section 117 is revised as proposed by Contu, it will become uncertain whether a program proprietor could receive payment on the basis of the extent of use of a program that he has

(Continued on In Depth/34)

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IN DEPTH

An Alternative Proposal

The author maintains that under his proposed amendment, the rights of proprietors of copyrighted programs would be strengthened without destroying whatever rights they now have. He proposes the following:

A) That Section 117 be repealed, but

B) That the following section be added: 117. Scope of exclusive rights: Use in conjunction with computers and similar information systems. Notwithstanding the provisions of Sections 102.b and 301, this title affords to the owner of copyright in a computer program all the rights that have existed at common law or under the statutes of a State.

C) That "computer program" be defined as follows: "...computer program" means a set of instructions capable, when incorporated in a machine-readable medium, of causing a machine having information-processing capabilities to indicate, perform or achieve a particular function, task or result";

D) That Section 106 of the copyright act be amended by adding section (6), so that the section reads as follows: "Subject to Sections 107

through 118, the owner of copyright under this title has the exclusive rights to do and to authorize any of the following:

"(1) to reproduce the copyrighted work in copies or phonorecords;

"(2) to prepare derivative works based upon the copyrighted work;

"(3) to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease or lending;

"(4) in the case of literary, musical, dramatic and choreographic works, pantomimes, and motion pictures and other audiovisual works, to perform the copyrighted work publicly; and

"(5) in the case of literary, musical, dramatic and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work, to display the copyrighted work publicly;

"(6) in the case of computer programs, the copyright proprietor has the exclusive right to execute, or perform, or otherwise use the copyrighted work and to authorize others to do so."

Figure 3

(Continued from In Depth/33) leased to someone else. Most program proprietors would prefer the "certainty" they have under common-law protection under the old law and under the present Section 117.

After all, it would be better for the program proprietor to have some rights with respect to use by lawful proprietors under common law than no such rights if the Contu proposal is adopted.

By its proposed amendment of Sec-

tion 117, Contu either means to remove this right or it does not. If it means to remove it, there should be an uprising of program proprietors if they want to continue to receive payment for programs on the basis of execution. If Contu does not mean to take this right away, then it should have no objection if the law is amended to make clear that such right is to be preserved.

In any case, if the statute is to be amended, the amendment should make

it clear that program proprietors may receive payment based upon the usage of their programs.

Need for Strength

Under the most favorable interpretation, the Contu proposal is too weak. It needs to be strengthened. Furthermore, the law needs to be strengthened to make it clear that the right to benefit from the trade secret laws shall be continued under any revision of the new copyright law.

The rights of program proprietors under the copyright law could be strengthened if four provisions are enacted into law (Figure 3).

Section A of the proposed amendment should be adopted only if the right of program proprietors to rely upon trade secrecy protection and the right to base payments on extent of program use are preserved.

Section B would secure common law rights, including rights under the law of trade secrets, at least as to future programs.

The definition of Section C is the same as that which has been suggested by the World Intellectual Property Organization (Wipo). Nothing would be lost to program proprietors by using this definition in place of that proposed by Contu.

I will not discuss the Wipo proposal here except to say that if and when a Wipo-type law is introduced to provide an additional form of protection for computer programs, it will not be necessary to be concerned about making the definition of computer programs consistent in the new act with that in the copyright act. The groundwork for consistency would already have been laid.

The meaning of Section D is obvious. Proprietors of computer programs would have a right to receive payment on the basis of execution, or performance, comparable to that accorded to proprietors of phonograph records and TV tapes. Contu's proposal would deprive program proprietors equal protection under the copyright law.

Proprietors' Rights

It is important that the rights of proprietors of copyrighted programs be retained because there are those who doubt the constitutionality of extending the copyright law to mechanical recordings, such as in machine-readable form.

The Constitution provides for protection of writings, and it is barely possible that the U.S. Supreme Court may someday hold that such machine-readable records are not writings. Such a holding would be very sweeping. It could apply not only to machine-readable computer programs but also to phonograph records and TV tapes.

Section 106 gives to the owners of those machine-readable records, including phonograph records and TV tapes, the exclusive right to perform and to authorize the performance of certain acts with the aid of those devices.

This right is given even though the

question of copyrightability of the machine-readable records under the Constitution has never been clearly decided by the Supreme Court. Similar rights should be extended to computer programs in order to remove some uncertainties that still exist in the law and to preserve to proprietors of copyrighted programs their legitimate right to receive payments on the basis of the use made of the program.

The strong alternative proposed would not only preserve for the software industry the benefit of the present new copyright law but also the advantages of the law of trade secrecy under the common law and the laws of the states.

It would also make statutory the right of the program proprietor to base compensation on the use of his program. In addition, by preserving the latter, some rights would still remain for the software industry just in case the Supreme Court should hold that machine-readable records are not "writings" under the Constitution.

Contu has spoken. It is time for the software industry to act if it wants to preserve what it has, instead of trading it for an empty bag, and if it wants strong protection for computer programs under the copyright law.



Reed C. Lawlor is a patent attorney who has published widely in the scientific and legal fields. He has written on judicial decision theory; patent, trademark and copyright law; and software protection.

He became registered as a patent agent in 1939, received a license as a professional electrical engineer in California in 1948 and was admitted to practice as a lawyer in that state in 1950. He has been in private practice since the end of World War II, first as a patent agent and then as a patent lawyer.

Active in many technical and legal associations, Lawlor has been especially prominent in the development of the application of computers to law, both within the American Bar Association (ABA) and outside of it. He has been chairman of two ABA committees and is presently a member of Committee 410 of the ABA's Patent, Trademark and Copyright Section, wrestling with the issue of computer software and patent protection.

Tying up the 80's

Heading into the '80's, two major questions face systems managers. First, how do you keep up-to-the-minute with ever-changing systems methodologies? Second, how do you combine the benefits of the various techniques? Ken Orr is in the forefront of developing such approaches, and because of this, he has a deep understanding of the approaches of the major systems scientists: Warnier, Jackson, Constantine, Ross, and DeMarco. Ken Orr can tie these ideas together for you in his most recent seminar, "Blueprinting the Future." This state-of-the-art seminar is aimed at professionals who are already heavily involved in structured systems development, and is an outgrowth of his 1978 comparative design methodology course. The author of *Structured Systems Development*, Ken Orr is one of the leading developers of structured technology. He has designed this seminar to address the rapid convergence of the different structured trends, incorporating major advances based on his own work in the application of structuring to data base, teleprocessing, and distributed systems design.

Seminars will be held only in New York Oct. 22-26, in Chicago Nov. 5-9, and in San Francisco Dec. 10-14, with one-day management overviews preceding these dates. For early registration or information, contact Bob Otey, Langston/Kitch, 715 E. 8th, Topeka, KS 66607, (913) 233-2349.

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When It Comes to DP . . . Hotel/Casino Dealt a Winning Hand

By Marguerite Zientara
CW Staff

LAS VEGAS — The Maxim Hotel & Casino here gambled and won when it turned to computing to handle its personnel management and financial accounting tasks prior to its opening in July 1977.

Labor management would be a priority operation in any hotel with 450 guest rooms and 800 employees. With the added attraction of a casino, however, cash and credit flow become a complex puzzle as well.

In searching for a system that could handle Maxim's unique requirements, DP Director David Corrao considered hotel systems based on equipment from Digital Equipment Corp., NCR Corp., Ontel Corp. and IBM. After looking for a centralized system rather than a number of stand-alone CPUs, one for each application, The Maxim found itself holding a losing hand. Nothing existed to fill the bill.

"We threw caution to the wind, got the best

technicians available to us from all our searches and put together a completely new package for the hotel/casino property," Corrao said.

"We took the best CPU we could find for the application itself, which turned out to be an IBM product," he added.

The Maxim's ace is a System/3 Model 15D with 256K bytes of main memory and 200M bytes of disk storage. Along with an IBM 5230 data collection system, the configuration supports on-line casino credit accounting, back office accounting, employee time and attendance reporting and payroll.

Twenty-seven on-line CRT screens are divided among the front desk, future reservations desk, casino pit area, casino cage, count room, housekeeping, accounting, sales, credit verification and the DP room. Twenty-four of the CRTs are IBM 3277s and three are plug-compatible units from Genesis One Computer Corp., acquired because of a lead-time crunch.

Two IBM 3277s in the casino pit and four in the casino cage are on-line to the System/3 for use by the pit boss and the cage staff. The terminals in the pit are used

(Continued on Page 52)

System/38 Delay 'Horrendous'

LAS VEGAS — While the Maxim Hotel & Casino here has been doing "just dandy" for two years with its IBM installation, things are going to be "horrendous" because of IBM's recent announcement of a six- to nine-month delay in System/38 deliveries.

"Our workloads and everything else had been scheduled around a June 1980 delivery date," according to DP Director David Corrao. "We considered the efficiency and economics of the system in planning our applications increases."

Now Maxim's DP department will have to increase the core memory of its System/3 Model 15D by 128K bytes as well as replace a 3340 disk pack with a 3344, giving the installation 2.5 times its present storage capacity, Corrao said.

While the hotel plans to keep the System/38 on order, its delayed installation may prove to be a problem because of Maxim's recent DP hardware changes.

Three Disk Drive Controllers Introduced for PDP-11, LSI-11

SUNNYVALE, Calif. — Advanced Electronics Design, Inc. (AED) has introduced three disk drive controller systems that are said to increase the storage capabilities of Digital Equipment Corp. PDP-11 minicomputers and LSI-11 microprocessors.

The first disk system, the Winc-01, consists of a microprocessor-based formatter/controller printed circuit board that connects with a Shugart Associates SA-4008 Winchester drive and a dual-width Q-bus interface card that plugs into the LSI-11 backplane. The system can accommodate up to three 20M-byte, 14-in. Winchester drives, providing a total media capacity of 60M bytes, an AED spokesman said.

Since the register structure of the Winc-01 is the functional equivalent of DEC's MPU controllers, DEC's RL-01 driver software is functionally adaptable to Winchester technology, he noted.

The second controller system is a microprocessor-based card that serves as a controller/formatter for four 80M-byte storage module drives. The Storm-02 plugs directly into a PDP-11 slot and completely emulates DEC's RJM-02 software, the spokesman said. The card is compatible with DEC's RH11, RM02 and RM03 driver software, according to AED. An optional second card can be added to the PDP-11 to accommodate four additional drives and a second CPU port, giving the system a total capacity of more than 500M bytes.

The controller card uses bit-slice 2901 microprocessor technology and provides a three-sector data buffer and self-test capabilities. Additional features include a 16-bit control and reporting center for address

(Continued on Page 50)

Self-Testing — Part 2

Remote, Built-In Diagnostics Reviewed on HP 3000 Series 33

By Lou DeWitt
And Jim Holl

In system diagnosis, it is not enough to have one set of fixed tests because the failures that occur are frequently unpredictable.

That is why the Hewlett-Packard Co. HP 3000 Series 33 not only tests on a microcode level, but also contains a stand-alone diagnostic utility system (DUS) that lets the customer or computer engineer use machine-level instructions to test memory, peripherals and communications channels.

Contained on a flexible disk, the DUS executes a myriad of tests that challenge the computer's ability to perform certain operations and recover from certain failures. To facilitate these testing activities, the system incorporates a flexible high-level maintenance language called Sleuth that allows

the engineer to write maintenance programs to focus on intermittent I/O and CPU problems.

So far, we have seen the evolution of a set of maintenance tools from the simple to the complex and from discrete circuitry to system parameters. There is, however, still another set of problems that makes separating a hardware fault from an operating system failure very difficult.

Joining Forces

To handle these problems, the system console, acting as a maintenance processor, and the maintenance interface can be used in a mode that allows the system specialist to gain access to the internal status of the system. In the maintenance mode, the maxi-

(Continued on Page 54)

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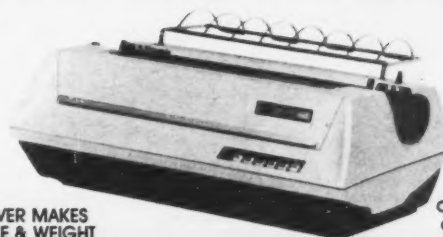
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Digital Equipment Corp.'s Miniminc

DEC Adds LSI Version To Minc Laboratory Line

MAYNARD, Mass. — A recently introduced entry-level member of Digital Equipment Corp.'s Minc laboratory systems family, Miniminc uses an LSI version of DEC's PDP-11 processor and has a 64K-byte random-access memory (RAM).

Designed for scientific, engineering and management problem solving, as well as for data reduction of laboratory information, the system allows users to create and save their own applications programs. It can also be used as part of a distributed data processing (DDP) network, a spokesman said.

The desktop unit includes DEC's VT105 CRT terminal, which has both alphanumeric and graphics capabilities.

Terminal features include scrolling, underlining, boldface, video reversal and split screen. In addition, screen width can be set by the user, and the terminal can be linked to a television monitor or a hard-copy device, such as a printer or plotter, via an RS-170 output.

Same Display Characteristics

The Miniminc has the same graphics display characteristics as the larger Minc systems, the spokesman claimed. In addition to alphanumeric characters, two 512-data-point graphs can be presented as point plots or shaded to a base line. Graphs can be treated as strip charts, shifting left or right as new data points are added.

Like the higher-end Minc systems, the Miniminc uses DEC's Minc Basic which allows users to transfer files between disk systems and issue commands to mass storage units. The software is an extension of PDP-11 Basic and reportedly accounts for the devices simplified program development capabilities. In fact, the software allows users to plot data arrays with a single statement, the spokesman said.

To handle distributed processing chores, the system has a serial printer port and a communications port with modem control for synchronous or asynchronous information transfer. Communications can occur at rates up to 9,600 bit/sec, the spokesman noted.

The minicomputer can use any one of 60 mathematical, statistical and financial analysis application programs written for Minc systems, he pointed out.

With deliveries scheduled for next month, Miniminc costs \$9,900 from DEC at 146 Main St., Maynard, Mass. 01754.

DEC Minis Get Controllers

(Continued from Page 49)

checks and a 32-bit emitter-coupled connector that provides single error correction of up to 11 contiguous bits, the spokesman said.

Lastly, the Sunnyvale firm unveiled a floppy disk system that gives DEC RX02 users double-headed drive capabilities. The Flex-02 emulates the RX02 software and is geared for LSI-11, 11/2 and 11/23 micro-based machines.

The system includes built-in troubleshooting memory diagnostics, software-controlled diskette overwrite protection and a data transfer rate of 8 microsec per word, the spokesman claimed.

A two-drive, single-headed Flex -02 with power supply and cabinet costs \$3,440; a double-headed unit costs \$3,940. The Storm-02 single-card system with one 80M-byte drive sells for \$13,500, and the Winc-01 costs \$6,700 including formatter/controller electronics, power supply and Shugart Associates SA-4008 disk drive.

The cards can be purchased without the hardware, but only under OEM arrangement, the AED spokesman stated from the firm at 440 Potrero Ave., Sunnyvale, Calif. 94086.

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*The hotel can accept room reservations only until September 30. To make yours call (312) 696-1234. Ask for the ASI Conference.

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When PIMCO was formed, in 1975, we began looking at computer hardware immediately. And we looked beyond the hardware. We also considered each manufacturer's history and reputation for integrity and the quality of service provided. When all the information was in, we selected the NCR 8200. I am happy to report that your users here in Florida—and everywhere else—rate NCR service as excellent.

NCR's MIDDLETON:

Did you anticipate moving up to the NCR 8430?

WALKER:

Not specifically. After all, ours is the first 8430 installed and wasn't available then. But as an agency sponsored by the Florida Medical Association to handle insurance for all the doctors in the state, we surely foresaw very rapid growth. And we were pleased by NCR's assurance we could move up to more powerful systems without obsoleting our software.

MIDDLETON:

That is NCR's Migration Path Engineering. You can move from one system to the next larger without paying a software penalty.



James W. Walker, M.D., (right) is president of Professional Insurance Management Company (PIMCO) of Jacksonville. Paul Middleton is his NCR account manager. The photo was taken in the formal garden behind the PIMCO offices on the edge of the St. John River.

WALKER:

I've been pleased, too, with the relationship which has developed between PIMCO and NCR. NCR has done everything you've promised us, and then some. And that's important, because I am making this system the central reference point in our business. I am resisting the tendency of the typical insurance office to depend on files in manila folders. We need NCR's Direct Processing to keep everybody always current.

MIDDLETON:

That is the outstanding feature of the transaction-driven, interactive I-8430. You go directly to the central

files through the terminals. If you enter new information, the central file is updated instantaneously. The new information is available for any subsequent operation. The central file is always current.

In the NCR office nearest you, there is an account manager like Paul Middleton who knows your industry and knows NCR systems. He can help you.

To learn more about what an NCR system can do for you, phone him at your local NCR office. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

NCR
Complete Computer Systems



System Deals Winning Hand to Las Vegas Hotel

(Continued from Page 49)
to access and update financial and credit information about players who frequent the casino on a regular basis.

Those in the cage provide information for credit checking and check cashing. "Trying to cash a payroll or personal check in Las Vegas is an absolute nightmare," Corrao observed. "Because of the

computer's access to an individual's credit history, we can now extend to our guests the privilege of check cashing, which most other facilities hold in abeyance." The system also incorporates an on-line IBM 1403 printer operating at 600 line/min and is linked to three remote IBM 3287 matrix printers working at 120 char./sec.

Accounting for casino operations during an eight-hour shift can sometimes take two or three hours when done manually. With the system, however, the staff reportedly can account for nearly \$1 million within minutes after the shift.

The hotel's front-desk programs handle group and individual reservations, check-in and checkout, posting of guest charges, preregistration and confirmation preparation, housekeeping, telephone operations and night audits, Maxim's DP director stated.

Accounting for Taste

Besides eliminating the need for 12 to 15 additional employees, according to Corrao, the system continues to save the hotel a substantial amount of money on a monthly basis, particularly in the area of meal accounting.

DG Offers Brochures On Buying

WESTBORO, Mass. — Two brochures for users thinking of purchasing a computer system are available from Data General Corp.

"A Guide to Evaluating Small Business Systems" (#012-722) provides a checklist of questions and a discussion of considerations involved in selecting a small business computer. The eight-page brochure addresses the vendor, software, hardware and financial aspects of purchasing a system. "Implementation Planning Guide for Eclipse Data Systems" highlights the major steps in installing a CPU. The 10-page brochure discusses planning and installation, DG support services, implementation considerations, staff training and software subscription services.

Both publications are available from DG's Communications Services, M.S. 82310, 15 Turnpike Road, Westboro, Mass. 01581.

Clarification

Although the recent article "Prime Unit Features 768K-Byte Memory" [CW, Aug. 20] clearly stated who makes the Information 500 minicomputer system, it did not state exactly where the system can be purchased.

Prime Computer, Inc.'s low-end supermini is sold solely through Prime's authorized dealers in the U.S.

Information on the dealerships, as well as on the system itself, can be obtained from Roy Finney, the firm's director of dealer sales, at 40 Walnut St., Wellesley Hills, Mass. 02181.

"Culinary workers in Las Vegas are entitled to two meals per shift as part of their union contract," Corrao explained. "Since the Internal Revenue Service requires us to pay a Social Security tax on those meals, they must be accounted for."

In order to obtain a meal, an employee must use his badge to clock into an IBM 5230 time entry station located in the cafeteria. As the badge is read, an electrical turnstile is activated, allowing the employee to enter the cafeteria; at the same time, his entry is recorded.

"We've found, through keeping track of meals taken, that only 65% of the employees take the free meal," Corrao said.

While most employers pay the tax based on the assumption that every meal offered is taken, the Maxim has certain knowledge of how much it must actually pay. "We're saving \$400/mo. more than the badge readers cost," Corrao said.

Generated Reports

Besides the meal accounting function, the data collection system provides the input data for employee time and attendance, employee payroll and manpower evaluation.

Reports generated as a result of employee badge transactions include daily employee time sheets showing regular and overtime hours and a supervisor's time and attendance "daily exception report" allowing verification of overtime, as well as checking of excessive meals and clocking variations.

Also generated is a manag-

er's time and attendance labor cost report that indicates daily cost totals for each department, for employee meals, regular hourly pay, overtime hourly pay and period-to-date totals. There is also a report showing the time and attendance month-to-date labor cost.

"We do basically every function on the computer that you could possibly conjure up for a computer to do within a hotel/casino," Corrao said. "We have the limelight in the Las Vegas area, you might say, on the basis of the fact that we put our faith in the computer rather than trying to emulate what we do by hand and still keeping a hand ledger somewhere besides."

Users Won Over

The DP shop has been successful "in winning over our internal users because the information we give them has been consistently correct," Corrao said. "Because of that, we've been very successful in creating new applications in interaction with other departments."

The Maxim's "useful computer time" — in a shop that runs 24 hours a day, seven days a week — is "in excess of 99%," he added. "We're doing just dandy with it."

Besides using its in-house-developed software at the Maxim, the hotel has a subsidiary that sells the programs to other hotels. The programs include a hotel system, a time and attendance system and a casino system.

Selling the software is Computer Information Systems, a subsidiary started about a year ago.

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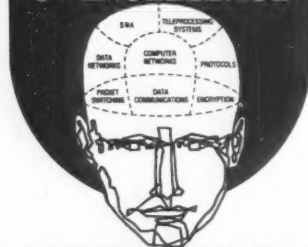
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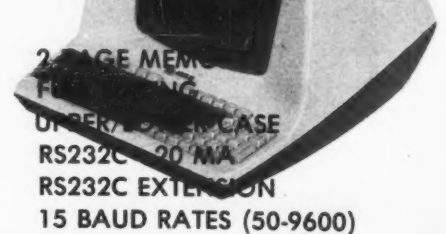
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Perhaps the best news of all, you can buy a Wang VS today for less than a System 38 will cost you next year.

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Insiders Review HP 3000 Series 33 Diagnostics

(Continued from Page 49)
mum in technical flexibility is achieved. The specialist is able to display or change the contents of the internal CPU registers and scratch pads as well as to single-micro-step the system through a group of special operations, setting micro breakpoints.

In addition, this particular mode enables the specialist to display any 16 words of memory, as well as change these locations and set, write or read memory breakpoints.

Going a step further, HP developed a microprogram that allows a remote HP 2645A terminal to become the system console with all of the maintenance tools already mentioned. By using the asynchronous communications capabilities of the system, a remote terminal can be connected to the system console through matching Bell 103- or Bell 212-compatible modems over connecting telephone lines. Thus, the engineer or specialist can use the same diagnostic

tools and system repair remedies remotely that he would use on-site.

The only help required at the system's end is someone to physically load the diagnostic tape cartridge or disk into the computer.

File Protection

Because the Series 33 can be controlled through a remote terminal, data security and file protection are extremely important. HP addressed these concerns by developing a spe-

cial sequence of events that must occur — under customer control — before anyone can use the maintenance functions remotely.

First, the data cartridge containing the remote microprogram has to be entered into the system console, which means that the operator on-site has to take an active role in rendering the system's remote capability usable.

Second, a side door giving access to the terminal junction panel must be unlocked in order to switch the modem from its normal terminal port to the console.

Third, after the connection is made, the on-site operator can see everything the remote user does; that is, all commands and responses are echoed on the system console.

Fourth, an LED on the system console alerts the operator or on-site engineer when the remote microprogram is active in the console.

On-the-Spot Determinations

Normally, for systems that do not have extensive maintenance capabilities, the isolation and correction of hardware or software problems begins with a telephone call to a field engineer. The engineer, working from the scant information usually obtained during this call, must then select a kit of spare parts to take to the customer's site.

With only this limited information available, however, an engineer may sometimes choose the wrong parts, which means that multiple trips may be required. These trips mean

more downtime and more costly repair.

Using a self-diagnostic maintenance system, however, the customer can frequently determine the problem on the spot. If a new part is required, one telephone call suffices — there will be no downtime resulting from multiple trips.

Off-Site Diagnoses

For tougher problems, the remote maintenance capability can be used. Once the problem is diagnosed — usually from a terminal in the user's office — the field engineer can bring the correct part on the first trip to the site. And not only can a specialist diagnose intermittent problems as if he were standing right beside the machine, but problems related to the operating system can also be diagnosed and patched around to have the system up and running as soon as possible.

Finally, in addition to being used for maintenance, the Series 33's remote capability can be used by the customer as an operational feature. Since the system can be controlled from a remote console, a customer could choose to "manage" the system from a central area that is physically remote from the computer. This gives added flexibility to users, especially those operating multiple systems in a distributed processing environment.

This is the second half of a two-part series. DeWitt is a product support manager and Holl is a project manager with HP's General Systems Division in California.

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AMA Conference Set For Boston, New York

NEW YORK — Minicomputers and small business systems — what they do, how they work and how they differ — will be the focus of a three-day course sponsored by American Management Associations (AMA) and scheduled to be held on Oct. 29-31 in Boston and Nov. 19-21 here in New York.

Directed by Donald R. Shaw, president of Business Counselors, Inc. and an expert on small computers, the sessions will tackle minicomputers from the standpoints of the novice and the seasoned business systems user. Topics will include understanding batch, on-line and interactive processing methods; pinpointing current operational costs and weaknesses; determining the effects of software on computer performance; determining hardware and software maintenance costs; and points to consider when deciding whether to buy, rent or

lease a computer system.

Contract negotiations, bargaining techniques, soliciting vendor proposals and understanding the user's role in planning, conversion and installation will also be covered in the courses, an AMA spokesman stated.

Team Discounts Available

Registration fees for the sessions are \$480 for AMA members and \$550 for nonmembers. In addition, team fees for three or more managers from the same company attending the same meetings are \$410 for AMA members and \$465 for nonmembers.

Additional information on these particular classes, as well as a free catalog describing a full range of other DP-related and administrative classes, is available.

The AMA's headquarters are at 135 W. 50 St., New York, N.Y. 10020.

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Cutting Layouts Planned on CRT Clothing Maker Sews Up Pattern Design

By Marguerite Zientara

CW Staff

MEMPHIS — A minicomputer-based system that helps create patterns for clothing manufacturers has reportedly minimized material waste, saved money and cut down pattern creation time by 75% for a large manufacturer based here.

Kellwood Co., whose primary client is Sears, Roebuck & Co., is involved in the apparel manufacturing process from pattern design to the final assembly of a finished garment.

ment.

While the actual sewing takes place in other plant locations, Memphis is the starting point for any Kellwood garment. It is here that patterns are designed and sized, and decisions are made as to how the cloth should be cut, according to Bobby Steenberg, operations supervisor.

For many years Kellwood did all its work here manually or mechanically, but two and a half years ago it acquired a Markamatic 3000 system from Camsco, Inc. of Dallas.

Using the system, based on the Hewlett-Packard Co. 21MX-E minicomputer, the pattern creation process begins with the inputting into memory of basic tried-and-proven patterns that can be modified to create new styles.

A designer then manipulates the stored patterns' lines — which were input with a digitizer — until those lines conform to his basic sketches for a new design, Steenberg explained.

Once the designer has a design with which he is happy, he can request a full-size, printed pattern from the system (generated by a plotter) so that a sample of the garment can be made.

Since each design will be made in a number of different sizes, patterns eventually must be "graded," or made in each size, formerly a costly and tedious manual process.

In the past, a pattern maker would have to provide a complete set of hand-drawn and

hand-cut patterns to grade each design. Now, however, the Markamatic system computes the digital definition of the required sizes and draws the graded patterns on the system's plotter.

'Marker Maker'

These graded patterns are not cut, but are displayed on the screen so the "marker maker" can arrange them into a master "marker." A "marker" indicates the optimal arrangement of pattern pieces on a piece of cloth for cutting, ensuring a minimum of waste in laying out material, Steenberg noted.

In the past, "marker makers" (those who arrange pattern pieces in markers) had to first perform a series of mathematical calculations that took into account fabric width, stripes and plaids and sewing considerations like darts and notches, he explained.

Now the marker maker does his job by using a data tablet and stylus to physically position pattern pieces on the CRT screen. After the marker is planned on the display, the Markamatic system checks each pattern piece for conformity to marking rules regarding sewing considerations, then the plotter generates a full-size marker.

Once there is a marker, Kellwood can cost out the garment, even though the piece may still be in the prototype stage. If there are problems with the design from a cost or design standpoint, the designer can use the system to make alterations and a new marker can be produced.

While apparel manufacturers have to have production markers ready in time to meet seasonal changes in demand, the Markamatic system allows a manufacturer to make last-minute changes without losing any production time, a Camsco spokesman said.

Thousands of master markers can be stored in memory for use at any time. Master markers selected for use in making garments are sent to Kellwood's clothing production plants for duplication on special machines.

"The markers we produce here are not cuttable markers but must be duplicated, because the ink we use to print them would come off onto the cloth otherwise," Steenberg said.

Current Developments

A year ago Kellwood upgraded from a Markamatic 3000 system, going from 64K to 128K bytes of memory on each of its five minicomputers.

While the firm uses the system mainly for marking and

grading, it is looking into a "cut-order planning" program, which would automatically select from memory the best possible marker for use in cutting each customer's order, Steenberg said.

The cut-order planning program summarizes cut-order data on a printed document and specifies how many times markers need to be used to satisfy each order's cutting requirements.

Kellwood's Markamatic system includes a digitizer, CRT console, plotter, two HP 7921 disk drives with 25 million words each and the five HP 21MX-E minicomputers with 128K bytes of memory apiece. Camsco developed all the system software.

AMS Meet Set Sept. 27

WASHINGTON, D.C. — Impact II, the second annual information management conference sponsored by the Administrative Management Society (AMS), will examine current developments in the "office of the future" concept here Sept. 27-28.

Highlighting Impact II's conference program will be case studies presented by three information management specialists: Robert Dickenson of Exxon Corp., Robert H. Smith of the Royal Canadian Mounted Police and Dr. Thomas Lodahl of Cornell University.

The conference fee is \$275 for AMS members or people from AMS member companies and \$300 for nonmembers, with a 10% discount for two or more people from the same organization.

AMS is located at Maryland Road, Willow Grove, Pa. 19090.

Braemar Updates Cassette Deck

BURNSVILLE, Minn. — Users of Braemar Computer Devices, Inc.'s CS-400 digital cassette decks can add a read-after-write feature to their equipment.

The CS-400B tape drive has a data capacity of 8.55M bits and an 8K bit/sec transfer rate. Input/output levels are standard TTL values, according to the vendor.

Read-write speed control and auto-sync phase encode/decode are built into the system. Operating modes are read, write and search forward and rewind.

The CS400B costs \$400, the vendor said from 11950 12 Ave. S., Burnsville, Minn. 55337.

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LSI-11 Users Get 32K Memory And Diagnostics

FREMONT, Calif. — Standard Engineering Corp. is offering Digital Equipment Corp. users an LSI-11/2 memory with 32K-word storage capability and a systems bootstrap and diagnostics programmable read-only memory (Prom).

The Prom has memory-sizing and diagnostics, an RX-01 floppy disk bootstrap, an absolute binary loader and a synchronous modem downline loader.

Other features include 18-bit memory addressing, independent automatic refresh, switch-selectable memory size (16K- to 32K-bytes) and integrated circuit sockets.

The memory costs \$845 with a one-year warranty from the firm at 44800 Industrial Drive, Fremont, Calif. 94538.

Apple II, TRS 80 Get Memory Device

SAN JOSE, Calif. — Users of S-100 bus systems can buy a 10M-byte mass storage system that will provide 50 times the capacity and 10 times the speed of current memory devices, according to the vendor, Corvus Systems.

The system is plug-compatible with the Radio Shack TRS-80 and the Apple Computer, Inc. Apple II.

Included in the system are an IMI 7710 disk drive with Winchester technology and two eight-inch hard disks; a Corvus intelligent controller; and an intelligent personality module. Software for each type of CPU is also included, Corvus said.

The Corvus system costs \$5,350 for a disk drive, controller and personality module. Add-on disk drives — the system can support four in a simple daisy chain — cost \$2,990, the firm said from 900 S. Winchester Blvd., San Jose, Calif. 95128.

Starplex Gets Cross-Assembler

SANTA CLARA, Calif. — National Semiconductor Corp. has introduced an 8048 cross-assembler for its Starplex development system.

The 8048 lets users assemble 8048, 8049 and 8050 source code into the machine code of the corresponding microprocessor. The resulting object code can then be loaded into the target microprocessor for testing, the vendor noted.

The cross-assembler's instruction mnemonics are completely compatible with Intel Corp.'s format as well as National Semi's 8080 and 8085 macro assembler.

The Starplex assembler menu has been modified to include the 8048 cross-assembler.

National Semi's 8048 cross-assembler is available on a single Starplex diskette for \$350 from the firm at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

EDS Starts Direct Mail Program, Opens Stores, Learning Centers

By Ann Dooley
CW Staff

DALLAS — Electronic Data Systems Corp. (EDS) jumped into the micro-computer market last month, offering business and home users several avenues from which to purchase microcomputer hardware and software.

One of those avenues is Inovision, a newly formed subsidiary of EDS, that is instituting a direct-mail catalog sales program of quarterly mailings targeted at more than half a million home computer users and electronics buffs. The first catalog will be sent out in mid-September.

The equipment offered will include Texas Instruments, Inc. and Atari microcomputers, as well as numerous video game programs. In addition to the microcomputers, accompanying software and peripheral equipment will also be featured in the catalog, according to an Inovision spokesman. TI's latest mi-

crocomputer, the 99/4, will be available through the catalog, as will video cassette recorders, calculators, video games and video cassette programs.

Inovision will also offer discounts through the Inovision Club, which will sell annual memberships for \$55. Members will receive a 22.5% discount on equipment purchased through the club.

A monthly news journal called "Visionary" will also be available to club members. It will cover home computer equipment, a video cassette rental program, a classified advertising exchange system called the Inovision Trader and an annual product guide to the consumer electronics field, a spokesman said.

In addition, two EDS computer demonstration centers will cater to the needs of the small business market. Located in Dallas and Houston, the two stores will offer complete hardware and soft-

ware packages developed for the small business's individual needs.

The idea behind the Business Systems Division is to reach into the showroom to provide users with a customized approach to microcomputers, an EDS spokesman stated.

EDS's third venture into the home computer arena is called Evolution 1. A packaged learning center, Evolution 1 will teach users how to buy microcomputers for either a small business environment or for home use. These learning centers were designed for use at retail stores and corporate learning centers throughout the world, according to the firm.

The Evolution 1 system will consist of a videotape player, a monitor and a video cassette library containing courses on small computers. The first series of lessons will include introductions to personal computing and business applications, instruction in Basic programming and techniques for using computers in small businesses.

Future series will cover more advanced aspects of small computer technology, the spokesman said.

Learning in a Hurry

"With millions of small computers entering our world in the next few years, millions of people must learn about computers in a hurry," according to Dr. Portia Isaacson, manager of the EDS Video Systems Division.

Salespeople currently have to spend all their time teaching people about computers instead of selling them equipment, she said. The learning centers will free them up for actual sales work, she noted.

EDS moved into the personal computer market because it wanted to tap a market that is projected to experience dramatic growth throughout the next decade, the EDS spokesman noted.

Percom Offers 6809 Adapter, Minidisk Storage System

GARLAND, Texas — Percom Data Co. is now offering a 6809 adapter for Southwest Technical Products Corp.'s (SWTP) MP-A2 processor card as well as two minidisk storage systems for Motorola Semiconductor Products, Inc.'s Exorciser bus and Micromodule.

Although designed for the SWTP card, the Percom adapter can be used to upgrade most other 6800 or 6802 MPUs to 6809 operation, the firm claimed.

The 6809 chip features expanded memory and register addressing capability. It also has a command and instruction set that includes the 6800 commands as a subset and has a faster rate of throughput than the 6800 chip does, according to the firm.

The original system can be restored by removing the adapter, which plugs into the 6800 socket, and a wire-jumpered DIP header, which plugs into the clock socket.

An operating system that is a version of Psymon, Percom's operating system for the firm's 6809 single-board computer is also available for users of the upgrade adapter. Psymon is available on 2716 read-only memory (ROM) and on diskette with source and object. The ROM version costs \$69.95 and the diskette costs \$29.95. The MP-A2 adapter upgrade costs \$69.95.

The two minidisk systems, designated the LFD-400EX and the LFD-800EX, are part of Percom's LFD family of minidisk systems for 6800 and 6809 micros.

Support software includes assembly language program development and debugging aids, advanced disk operating and file management systems, a data base

management system (DBMS), a Super Basic interpreter and a selection of business application programs, according to the firm.

Different Storage

The difference between the two storage modules is in data storage capacity, the firm noted. The LFD-400EX drive can store 102K bytes of formatted data on 40 tracks, and the LFD-800EX drive can store 200K bytes on 77 tracks. Both sides of a minidiskette can be used for storage with the LFD-400EX.

Prices for the LFD-400EX and LFD-800EX one-drive system are \$649.95 and \$945.95, respectively, and go up to \$1,449.95 and \$2,245.95, respectively, for a three-drive system. Percom is at 211 N. Kirby, Garland, Texas 75042.

Computer Headware Updates Self-Indexing Query System

BELLEVUE, Wash. — A Basic compiler for 8080 and Z80 CP/M systems is now available from Microsoft, Inc.

The compiler supports all the commercial features of Microsoft Basic-80, and the compiler's optimized, relocatable machine code is in the firm's standard binary format. This means the compiled Basic programs can be loaded and linked with subroutines generated by Microsoft's Fortran-80 and Cobol-80 compilers and by the Macro-80 macro assembler.

The compiler can be used as a development tool for microprocessor system and applications software. During compilation, optimizations are performed to

reduce the size and maximize the speed of the resulting binary code.

The compiler's code generator is template-driven, allowing optimal sequences to be generated for many operations.

The Basic compiler language includes double-precision trigonometric functions, full print using for formatted output, disk file capability and a CALL statement to call Fortran, Cobol or assembly language subroutines.

The Basic compiler is supplied on a CP/M diskette with the firm's standard Macro-80 assembler and Link-80 linking loader for a cost of \$395 from Microsoft at Suite 819, 10800 N.E. 8th, Bellevue, Wash. 98004.

MICROCOMPUTING

Memory Boards Introduced, Z80 Systems Adapter Upgraded

SUNNYVALE, Calif. — Relational Memory Systems, Inc. (Relms) has introduced two high-speed 64K-byte memory boards and an improved version of the firm's Z80 Systems Adapter Module (SAM) for Intel Corp.'s Intel 800, 888 and single-board computer applications.

The two memory boards, designated the RMEM — 64/8 + 16 and the RMEM — 64 8 + 16, feature 250 nsec access times, page-switching options and on-board and sequential refresh.

The RMEM — 64/8 + 16 can be used with 8- and 16-bit bus masters and offers 1M byte of one-half me-

gaword addressability. The second board allows access in an 8-bit mode when strapped for an 8-bit processor.

Alternatively, this board can be used in 16-bit mode with 16-bit bus masters. Relms' Z80 SAM allows designers to develop software faster and features an Isis-II-compatible Z80 relocatable macro-assembler and extended Z80/MDS macro-monitor with debug functions, the firm said.

The Z80 SAM comes with hardware, diskette and documentation for \$1,695 from Relms at 1180 Miraloma Way, Sunnyvale, Calif. 94086.

National Software Offers TRS-80 'Super Disk'

HOLLYWOOD, Fla. — Two "Super Disk" software packages that run on Radio Shack's TRS-80 have been released by National Software Marketing, Inc.

The Super Disk-1 contains 42 programs including inventory, amortization, decision theory, payroll and games. The Super Disk-1 costs \$13.95 and includes a floppy disk. For the same price, the Super Disk-1A contains eight fewer programs. It was designed for a single-disk system, while the Super Disk-1 was designed for a dual-floppy configuration.

The second package, the Super Disk-2, is for the mathematician or the business man, according to the firm. It

contains 70 programs such as interest calculations, investment analysis, geometric calculations and conversions. It was designed for a dual-floppy configuration, while the Super Disk-2A was designed for a single-floppy disk system and contains fewer programs. Each set of programs costs \$13.95.

National Software is at 4701 McKinley St., Hollywood, Fla. 33021.

Printer Based On Selectric II

ANAHEIM, Calif. — A letter-quality terminal/printer with IBM Selectric II typewriter capability designed for use with the Radio Shack TRS-80, Apple Computer, Inc. Apple II and other microcomputers has been introduced by Micro Computer Devices (MCD).

Called the Selectra-Print, the combination output terminal/printer is a computer version of the IBM Selectric II and incorporates customized actuator solenoids for print commands.

Standard features include 31 changeable type fonts and sizes, 15 char./sec speed, full upper- and lowercase alphanumeric display, tab commands and backspace and index keys.

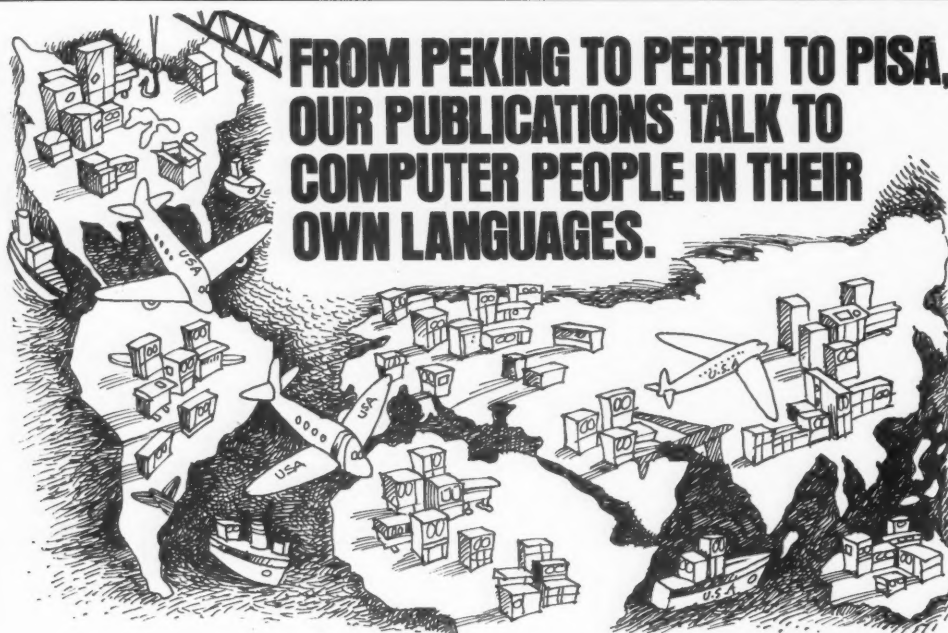
The Selectra-Print costs \$1,925 for the TRS-80 interface and \$1,850 for other microcomputers. More information is available from MCD at Department H, 3156 E. LaPalma Ave., Anaheim, Calif. 92806.

Wintek to Hold Micro Workshop

LAFAYETTE, Ind. — A single-board microcomputer including a 6800 MPU, random-access memory (RAM), serial I/O, parallel I/O and a 1K-byte read-only memory (ROM) with a monitor and debug program will be given to all participants of Wintek Corp.'s fall '79 hands-on microprocessor workshops.

Attendees can use their microcomputer at the short course and then keep it. Each workshop includes a three-day introduction to microprocessor hardware, software and economics, followed by a two-day interfacing workshop dealing with interfacing micros to a working situation.

Tuition is \$399 for three days, \$299 for two days and \$449 for five days. The workshops will take place Oct. 15 in Washington, D.C.; Oct. 22 in Lafayette, Ind.; and Dec. 3 in Lafayette, Ind. More information is available from Wintek at 902 N. 9 St., Lafayette, Ind. 47904.



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TO Diana La Muraglia
Manager Of International Marketing Services
CW Communications, Inc.
797 Washington St., Newton, MA 02160

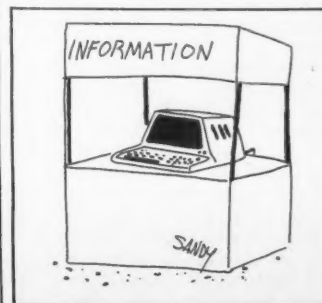
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By Marcia Blumenthal
CW Staff

DES PLAINES, Ill. — The metamorphosis of Systems Management, Inc. (SMI) from a software consulting service to a full-fledged software development house and hardware dealer has been a "long, painful and not particularly profitable process," George Ridgway, SMI's president and founder, said candidly.

The emphasis on the nitty-gritty of software development standards and documentation procedures during the infancy of the 10-year-old firm has been Ridgway's guiding philosophy. And this philosophy has started to pay off.

For example, SMI was the only company to gather software accolades in Management Information Corp.'s recent annual survey of small business users.

In addition to being a software house, SMI

Software House Puts Emphasis On Nitty-Gritty

is an OEM systems builder for Microdata Corp. The company also represents Prime, Inc.

When Ridgway started his company in 1969, he never thought about the possibility of selling hardware. At that time, his business was confined to helping companies with computers and DP staffs to develop work flow and product control standards.

Clients told Ridgway that because he did such a good job helping them process their data, he should help develop standards for what they processed. From 1970 to 1972, Ridgway worked in cooperation with three other companies to come up with processing standards — for example, the proper structure for a file identification instruction.

During this phase of the company's history, Ridgway was aiming for membership in the Association of Consulting Manage-

(Continued on Page 63)

With Software for DEC Systems Heath Dips Into Small Business Market

By Marcia Blumenthal
CW Staff

BOSTON — With the acquisition of a Digital Equipment Corp.-compatible operating system and five standard business packages, Heath Co. has dipped its feet into the swirling waters of the small business system market.

Known primarily for its leadership in electronic kit sales, Heath, recently acquired by Zenith Radio Corp., had been selling the components of its DEC LSI-11/2-based system to OEMs and for use in applications that do not require packaged business software.

The firm was shut out of the small business market until now because it could not offer software to run with its DEC PDP-11/03-compatible system. Recently the firm acquired licensing rights to Dibex, Information Access Systems, Inc.'s Dibol-compatible software.

"We based our system on a DEC environment because it is a conduit to an interesting base of software," Larry Plummer, Heath Data Systems computer product manager, explained.

"The main claim to fame that the 500 or so DEC OEMs have is application packages written in Dibol," William E. Johnson, vice-president of marketing, added. With Dibex, Heath's system can run any Dibol application package, he maintained.

To prepare for its entry into the new mar-

ket segment, Heath recently created Heath Data Systems, a separate profit center within the company responsible for these business systems, and established a separate sales organization for the product.

Heath is distributing its product on an OEM basis to DEC OEMs and also to distributors that sell to retail outlets. Plummer said the firm has already signed three retail distributors — Microage, Byte Industries,

Inc. and Computerland — which have each signed contracts in excess of \$1 million.

In addition, the firm is currently negotiating a similar arrangement with Creative Computer Marketing, the distribution arm for the Computer Stores chain, Plummer said.

There is no real winner on the retail level because of the lack of software in that mar-

(Continued on Page 60)

Adapso Asks Justice to Move Against Bell Sales of Software

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Charging that AT&T has violated the 1956 Consent Decree, the Association of Data Processing Service Organizations (Adapso) has asked the Justice Department to take "appropriate" action concerning the Bell System's sale of general-purpose software packages.

"AT&T and Western Electric Co. [its manufacturing subsidiary] are blatantly violating . . . the decree by publicly offering for licensure computer software packages which have general-purpose applicability," Adapso said in an Aug. 20 letter to the Justice Department. Under the 1956 agreement, AT&T is excluded from the unregulated

data processing marketplace.

In the letter, Adapso Executive Vice-President Jerome L. Dreyer urged Justice to "immediately initiate appropriate proceedings" against AT&T.

Bell System software offerings include a number of packages for use on various Digital Equipment Corp., Honeywell, Inc. and IBM systems. The packages, developed by Bell Laboratories, are offered in such high-level languages as Cobol, Fortran and PL/I.

AT&T has argued that it is not in violation of the Consent Decree because the software packages were developed for internal use and have little practical applicability outside the telephone industry.

(Continued on Page 62)

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Penril Makes Acquisition

ROCKVILLE, Md. — In keeping with President Kenneth M. Miller's growth strategy, Penril Corp. recently acquired for about \$2.3 million the business and substantially all of the assets of Ambac Industries, Inc.'s Tele-Dynamics communications products.

Forecasting revenues of \$100 million within the next three years, Penril has chosen to grow by acquiring divisions of larger corporations. Where possible, Miller intends to

avoid purchasing small businesses run by owner-founders "who have a great deal of emotion attached to their business" and who often retire soon after they sell out.

Tele-Dynamics' products include a series of 1,200- to 4,800 bit/sec modems. Annual revenues for that subsidiary are about \$2 million.

For the first nine months of fiscal 1979, Penril reported revenues of \$16.3 million, up 60% from the 1978 period.

Heath Enters Small Business Mart

(Continued from Page 59) ket, Johnson said. While he credited Radio Shack with creating an awareness of the potential of marketing small business systems through retail stores, he does not consider the software for the TRS-80 adequate.

However, he did note that vendors which sell on the retail level, such as Apple Computer, Inc., are now beginning to pay more attention to business software.

Aiming its other major marketing thrust at DEC OEMs, Heath's main selling points are availability and cost. Heath claims its system, the WH511A, is 26% less expensive than DEC's PDP 11-03. In 100-piece quantities, Heath offers OEMs a 35% discount.

Moreover, after an OEM orders 100 of a particular product, it can slide in other products regardless of quantity for the same 35% discount, Plummer said.

Heath currently is beta-testing a half-dozen units with small businesses located near its Benton Harbor, Mich., headquarters. Plummer said the systems will be ready for shipment in 60 to 90 days.

The price for the processor, floppy disk, terminal and operating system is \$6,289. The system's printer is a Texas Instruments, Inc. 810, which OEMs will probably want to buy directly from TI to receive a better margin, Johnson acknowledged. If the system is configured with the printer, its price is in the \$11,000 range, he added.

Although not yet out of beta testing on its first small business system, Heath is already planning upgrades. By the first of next year, the firm anticipates adding a hard disk feature, with the controller board supplied by Xylogics, Inc. and a Hawk drive from Control Data Corp.

Moreover, Plummer noted DEC is in the process of developing an LSI-11/23 processor which is rumored to be four times as fast as the PDP-11/03 and contain 256K bytes of memory instead of the PDP-11/03's current 60K bytes. Heath plans on integrating this new processor into its product line.

Show Set For Mexico

MEXICO CITY, Mexico — The U.S. Department of Commerce will sponsor a Computers and Peripheral Equipment Exhibition at the U.S. Trade Center here on Nov. 6-9.

Forty-six companies participated in last year's show, which was attended by 3,200 businesspeople from Mexico and Latin America.

This year, exhibitors will include IBM, Hewlett-Packard Co., Tektronix, Inc., Intel Corp., Microdata Corp., Durango Systems, Inc., Data-products Corp., Codex Corp., and Radio Shack.

More information on the show is available from Mary R. Wining, Industry and Trade Administration, Room 4031, U.S. Department of Commerce, Washington, D.C. 20230.



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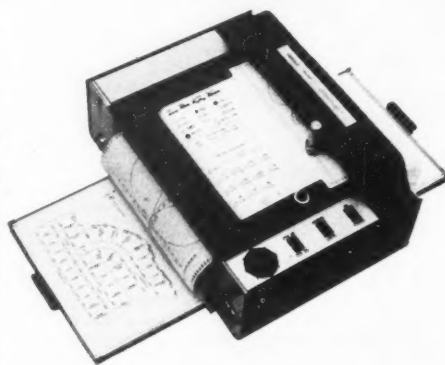
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Datatrol Back in Court Over Lottery System

By Marcy Rosenberg
CW Staff

BOSTON — In its continuing battle to win a \$25 million contract from the Massachusetts State Lottery Commission, Datatrol, Inc. has returned to the courtroom to try to invalidate the state agency's third request for proposals (RFP).

The company filed a motion with the Massachusetts appeals court for an injunction to prohibit the commission from violating an earlier superior court ruling declaring null and void its prior award of the contract to American Totalisator (Amtote). This decision upheld Datatrol's contention that the contract for an automated on-line lottery system was not awarded on a competitive, lowest bid basis [CW, June 25].

Datatrol's most recent court action followed an appeals court ruling that the contract be put out for bids yet a third time. The ruling was made in response to a request by the Attorney General's Office for a judgment to allow Amtote to begin installing the on-line system.

The court also required the commission to draw up its own specifications for the equipment it seeks to acquire in the RFP. The previous two RFPs were presented as problem-oriented bids, allowing the potential contractors to write the specifications.

Objection to Specs

Now, Datatrol is objecting to the specifications outlined by the commission, claiming they specifically describe the Amtote system, a Datatrol spokesman said.

Among the specifications in contention are:

- The optical reading device must have an automatic cashing capability.
- Terminals proposed must allow proper operation at 16 terminals per communications circuit.
- Keyboard to be provided must be a minimum five-row keyboard with a total of 100 keys.
- Display must be a minimum 32-character full alphanumeric LED-type or equivalent unit.
- Ticket printer must have an effective print rate of at least 200 char./sec.

While refusing to give specifics on the Datatrol system, the spokesman said these specifications do not appear in current Datatrol models.

"We could have designed these characteristics into our system, but not within the time constraints specified by the commission," he added. The third invitation to bid was dated July 31 and issued Aug. 3; it calls for a live equipment demonstration on Sept. 7 and asks for installation on Jan. 25, 1980.

Only Two Other Bidders

Amtote refused to discuss the characteristics of its on-line system in relation to the specifications outlined in the commission's RFP.

So far, only Amtote and Autotote, Ltd. of Newark, Del., have submitted bids on this third RFP. Autotote, however, had also objected to certain of the commission's required specifications. "On our first inspection of this RFP, we were inclined to believe it was a sole-source offering," noted Michael Mackey, Autotote sales manager of wagering systems, naming that sole

source as Amtote.

Autotote's standard on-line lottery system meets or exceeds all specifications except the keyboard requirement. Its keyboard contains five rows, but only 90 keys, Mackey said.

After questioning this requirement in a letter to the commission, Autotote was assured by the commission that it could submit a bid and that if it won the contract, it could retrofit its system in the field to the 100-key configuration.

However, Mackey cited several "preferences" stated by the commission in its RFP that Autotote cannot currently meet. These are for an impact printer, countertop terminals and for vertical feed to the optical reader

assembly.

Autotote's countertop system provides parallel feed to the optical reader and is configured with thermal printers. Autotote has not received any response from the commission regarding these matters, but decided to bid on the contract anyway.

Mackey admitted, though, that his firm's inability to meet all preferred and required equipment specs "could work against us" in winning the contract.

Neither Autotote nor Amtote would reveal the amounts of their bid. The commission will not open the bids until a decision is made on the Datatrol motion, according to John Boyle, the commission's legal counsel.

About contentions that the state's

specifications show favoritism to Amtote, Boyle maintained, "We did not arbitrarily select any of these requirements."

According to Boyle, the stated specifications are based on the commission's need to interface any new on-line system with its existing off-line system that collects and reads slips from throughout the state using optical scanners. "When we go on-line, we will not be eliminating the off-line system," he commented.

"Some" of the more distant off-store locations will be put on-line to allow them to stay open later, Boyle explained, adding that the commission currently depends on couriers to physically gather slips from each location and deliver them to headquarters.

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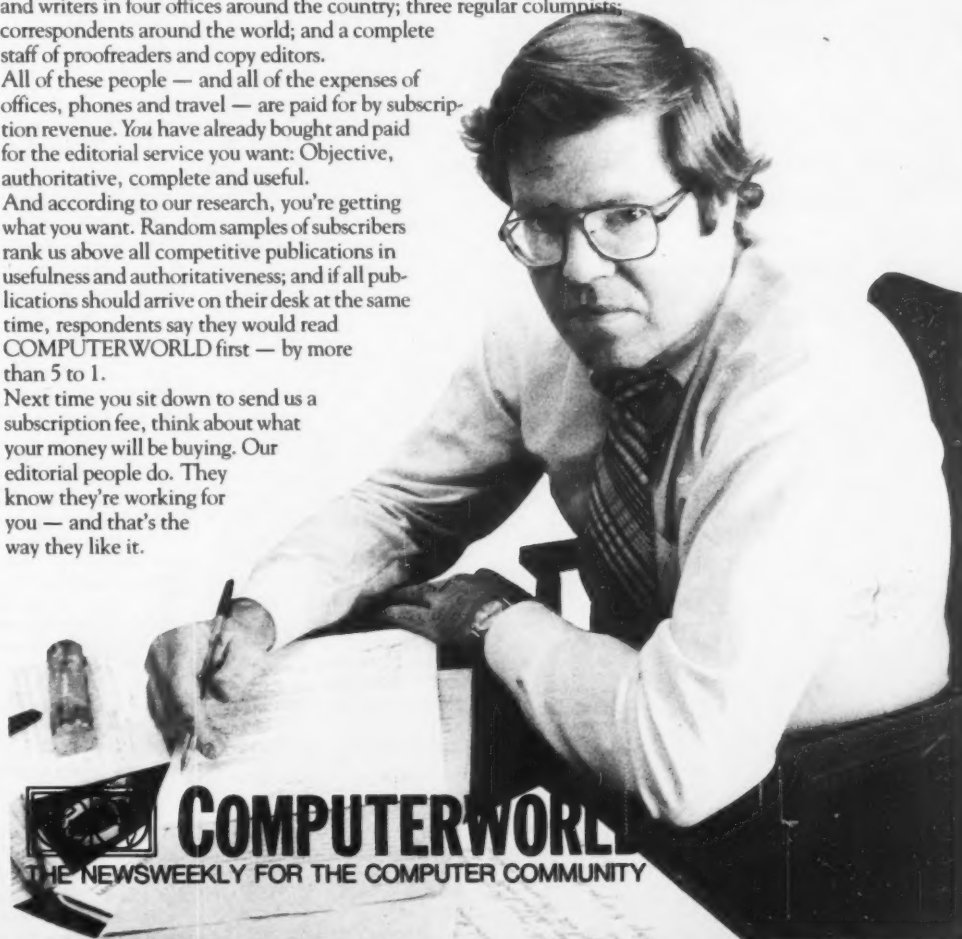
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Contracts

Nixdorf Computer Corp. has signed a \$4.2 million contract with the U.S. Bureau of the Census. The contract is for 37 Nixdorf 480 systems.

Dataproducts Corp. and Globus Digital S.A. of Rio de Janeiro, Brazil, have signed a \$17 million agreement placed over five years. The agreement is for B-300, B-600 and M-200 printers and technology transfer on these products.

Datrol, Inc. has received a contract for more than \$250,000 from Jacobson Stores for its RS9000 credit management system.

Harris Corp. has received a \$14,935,186 contract from the Army Electronic Research and Development Command, Ft. Monmouth, N.J., for development of data-handling links

for airborne and ground electronic terminals to be used in three separate military projects.

Pertec Computer Corp.'s Service Division has signed a two-year contract with Sentinel Computer Corp. of Cincinnati to provide field maintenance for Sentinel's line of microcomputer-based small business systems.

Datrol, Inc. has received a contract worth more than \$500,000 from Lord & Taylor, a division of Associated Dry Goods Corp., for its RS9000 credit management system.

ICE, Inc. has signed a multi-year contract with Keydata Corp. to provide nationwide maintenance for Keydata's Unity series of business accounting computer systems.

Vendors Temporarily Exempted From the Service Contract Act

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — The Department of Labor has granted a temporary exemption from the controversial Service Contract Act for government data processing and telecommunications equipment hardware contracts.

The 90-day waiver was granted to allow the General Services Administration (GSA) to complete negotiations on some 250 DP and telecommunications contracts for fiscal 1980. The contract talks, scheduled for completion by early October, have been delayed while GSA and the Department of Labor work out an agreement on how the act should be applied to this type of procurement.

The 1965 law provides for federally determined minimum wage scales for employees of federal maintenance and service contractors. Since the law was extended to DP contracts on June 8, a number of firms, including Hewlett-Packard Co. and Digital Equipment Corp., have balked at signing contracts that include Service Contract Act provisions.

Recently, IBM Chairman Frank Cary and NCR's chairman, William Anderson, sent letters objecting to the act to Labor.

The companies claim the law will adversely affect industry

merit pay schemes, thereby harming their ability to compete in the nongovernment marketplace.

The companies, backed by the Computer and Business Equipment Manufacturers Association (Cbema), are pressing the government for exemption from the act for all DP and business equipment maintenance agreements. Cbema is arguing that the law was designed to protect low-paid service workers from "wage busting" and was not meant to cover such high-salaried workers as computer service technicians and programmers [CW, July 30].

Support From GSA

Cbema's position has gained some support on Capitol Hill and at GSA. According to Frank Carr, commissioner of the GSA Automated Data and Telecommunications Service (ADTS), the agency feels contracts that are primarily for the acquisition of equipment and only incidentally include maintenance provisions should not fall under the act.

"We're not saying the act doesn't apply in this area," Carr said. "We're simply saying that it should not apply to those contracts where the principal purpose is equipment . . . But that it should apply in those cases where the contract is for maintenance only."

GSA and the Department of Labor are continuing to work toward agreement on how the act should apply to DP and telecommunications equipment procurements. Labor offered the exemption to allow the unfinished 1980 contract negotiations to be completed on schedule, Carr said.

The Department of Labor looks at the maintenance portion of contracts "as a separate bid specification" that should come under the provisions of the act, he added.

The ADTS commissioner predicted that GSA and Labor will agree on a formula for applying the act within the next month or two, although none of the contracts signed during the 90-day exemption period, which ends Nov. 9, will be covered by the law in any way.

In the meantime, Cbema is "not terribly happy with the temporary exemption," according to a spokesman, Jeffrey T. Wood. The association is working for "a total and permanent exemption" that will include all maintenance agreements on DP and business equipment.

Wood indicated Cbema will continue its lobbying effort for that total exemption in spite of the temporary waiver. "If we fail to get administrative relief [from the Labor Department], we're going to continue to push on [Capitol Hill]," he said.

Adapso Asks Move Against Bell

(Continued from Page 59)

That position has been steadfastly challenged by Adapso and others in the DP industry, such as the Computer & Communications Industry Association. Both associations have protested the software offerings to the Justice Department in the past.

Adapso's Dreyer said the recent request for government action comes after "the inability of Adapso, despite a consistent and good faith effort, to negotiate with AT&T a 'businessman's' resolution of the questions posed by the Bell System software issue."

"For almost a year, Adapso has attempted to deal amicably and in a forthright manner with AT&T," he said. "It is now apparent . . . that AT&T and Western Electric will continue marketing Bell System software despite the restrictions of the Consent Decree."

Challenge of Decree?

Summarizing the Adapso argument, Dreyer said, "AT&T and Western Electric's entry into the computer software market is neither directly related nor incidental to their communications services. In

our judgment, this places them in direct conflict with the Consent Decree."

Adapso sees the Bell software marketing as a direct attempt by AT&T to challenge the 1956 agreement. "It has also become clear that AT&T considers its software offering to be a meaningful test of the viability and elasticity of the Consent Decree as well as a very clear test of the commitment of the Department of Justice to enforce this decree." Because of "Department of Justice inaction in the face of aggressive Bell System software marketing," the Federal Communications Commission (FCC) has advocated the "startling . . . conclusion" that AT&T is firmly entrenched in the software business, Adapso said.

In the recent "tentative decision" in its Second Computer Inquiry, the FCC concluded, "There does not appear to be any limitation on the types of 'in-house' programs that the Bell System may develop under this [decision], and correspondingly there does not appear to be any limitation on the marketing of such programs by Western Electric."

In addition, Adapso noted, the FCC found that "Course of conduct indicates, therefore, that AT&T is able to market computer software programs outside the scope of tariffed communications services and free from any degree of public regulation without violating the Consent Decree."

Litigation a Possibility

Dismayed by this trend of nonenforcement of the Consent Decree, Adapso said that "if the Justice Department fails to act within a reasonable period of time, Adapso may be forced to take further legal action."

Private litigation against AT&T will be considered by the association if the Justice Department has not responded favorably to the Adapso request for action by the middle of next year, according to Dreyer. "We'd rather resolve this particular problem in the forum we tried to establish, which was the businessman's meeting, and we will definitely not rule out that possibility," he said, adding that "we've left the door open for further discussion" with AT&T.

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CII-HB Makes First U.S. Acquisition

PARIS — CII-Honeywell-Bull (CII-HB) is making its first U.S. acquisition, buying for cash System Industries, a Sunnyvale, Calif., mini-disk maker.

The acquisition has been agreed to by the boards of directors of both companies, and the definitive agreement is expected to be reached by year-end.

The purchase gives CII-HB an immediate U.S. OEM network for products manufactured by its disk

operation in France. In addition, the firm will gain engineering and maintenance support for its U.S. customers.

In return, System Industries expects the acquisition to enhance its technological and financial resources, according to Dr. Edwin V.W. Zschau, its chief executive officer. Founded 10 years ago, System Industries has more than 5,000 disk systems installed in the U.S. and had sales of more than \$20 million in its most recent fiscal year.

Ramtek '79 Net Dips 79%

SANTA CLARA, Calif. — Ramtek Corp. reported a 29% gain in revenues but a 79% decline in earnings for fiscal 1979 compared with the previous year's results.

Ramtek's 1979 revenues totaled \$15.2 million compared with \$11.7 million a year ago. Earnings for the year were \$284,000 or 18 cents per share, down sharply from the \$1.3 million or 89 cents per share reported last year.

Contributing significantly to the re-

duced earnings was a fourth-quarter loss of \$774,000 from the discontinued recreational products operations, which caused an overall loss of \$440,000 for the firm's final quarter.

Commenting on the financial performance, Charles McEwan, president and chairman, said the firm would now concentrate its energies on computer displays. That segment of Ramtek's business increased 100% last year, he noted.

SMI Stresses Nitty-Gritty

(Continued from Page 59)
ment Engineers (Acme), a professional organization with tough entry requirements.

But this goal soon dissolved when Ridgway saw the power of the Microdata system. He decided to concentrate on offering a complete DP result for users instead of aiming for the rarefied atmosphere of Acme. He had already had some experience developing application packages in conjunction with two firms in the Philippines.

The addition of hardware offerings allowed SMI to grow dramatically. With an ambitious sales goal of \$100 million by 1984, SMI needs even more hardware capability, Ridgway said.

For that reason, he took on Prime's line. "Part of our marketplace needed a larger system. Prime picks up where Microdata leaves off," Ridgway noted.

Moreover, SMI has just added another hardware offering. The company recently finished benchmarking its software for Honeywell, Inc.'s Level 6 models 43 and 53, which were adapted to run with a Microdata Reality-type operating system developed by Ultimate Corp. of New Jersey. SMI will be the Level 6 dealer for Ultimate in dozen Midwestern states, Ridgway disclosed.

Although SMI offers a wide and growing range of hardware, Ridgway doesn't see hardware as a highly profitable item, but he conceded it does propel software sales.

Software More Profitable

On the software side, SMI has developed its own language. Called Real Time Processing, the language is used with application packages such as business and manufacturing control. The firm develops uniform integrated software packages in conjunction with seven of its clients as well as on its own.

Demonstrating the relative unprof-

itability of hardware, Ridgway said hardware sales represented 70% of revenues last year, but only 28% of pretax profits. By comparison, software represented 25% of revenues and 94% of the pretax profit margins.

One reason SMI's software is now so profitable is that the accounting standards board requires software development costs to be expensed in the year the software is developed. SMI has had to expend about \$3 million for software development over the past four years, Ridgway claimed.

As a result, SMI has been unprofitable for the past few years. However, the picture is beginning to change, and the dollars expended for software development are starting to pay off.

For its latest fiscal year ended June 30, SMI's revenues exceeded \$9 million, up from \$5 million a year ago. Although he wouldn't disclose exact earnings figures, Ridgway said the company netted in the vicinity of \$600,000 compared with last year's half-million-dollar loss.

Ridgway expects SMI will be able to generate its growth through income from operations rather than bank borrowing.

Cost-Cutting Procedures

In addition to greatly reducing software expenses, SMI has instituted cost-cutting procedures. Stringent documentation of software has streamlined SMI's labor needs. "We can do twice as much installation business next year with only about 30% more people," Ridgway said.

The firm also offers customers on-line remote diagnostic service, providing an acoustic coupler with every system installed.

Although SMI sells both hardware and software, Ridgway doesn't believe in the concept of turnkey systems, and for that reason SMI's services remain unbundled.

Nickels & Dimes

Amdahl Corp. has signed a \$260 million multi-currency credit agreement with a group of 13 international banks. Superseding the firm's current \$100 million line with six European and U.S. banks, the agreement extends through 1981. It also contains options for the conversion of up to \$200 million in outstanding borrowings to term notes payable through 1984.

\$\$\$

Manufacturing Data Systems, Inc.'s

president and chief executive officer, Kenneth R. Stephanz, said he has no explanation for the current activity of the firm's stock, claiming the company is not engaged in any acquisition talks.

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In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (or at least their entries will) and six lucky winners will be drawn more or less at random (we never said the judges were fair). These six lucky souls will receive a free hand-held computer game valued at well under \$100 if we can do it.

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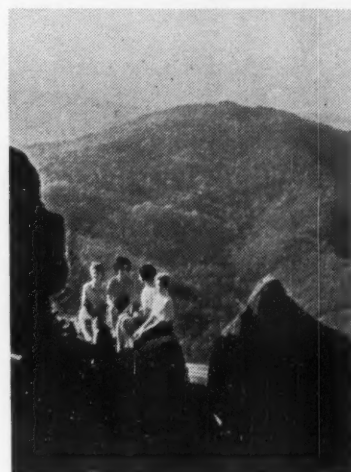
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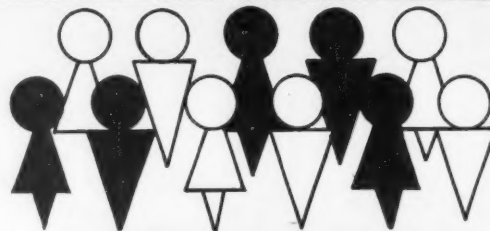
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Database Development

Wang Labs has already announced a major new DBMS; we are planning to offer considerably more.

We are looking for a highly creative individual to develop products of the future.

This position provides the opportunity to do systems design and implementation with major emphasis in the area of transaction processing and distributed data bases. The position is certain to provide the individual with the most challenging design problems available today, and to present a major new facet not yet addressed by commercial DBMS's.

The successful candidate will be highly motivated, able to assume design responsibilities, have an interest in man/machine interfaces, and a proven track record in systems development.

If you would like to join the #2 company in the area of small business computers whose approach to design and development has taken it from a corporate population of 35 to over 7500 in just 15 years, with present sales in excess of \$320 million, send your resume with salary history to Elaine F. Rosenberg, Technical Recruiting, Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851.

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Due to our rapid growth and expansion, we have two positions immediately available for data processing oriented individuals with a background in COBOL and/or a degree in Computer Science or Information Systems or equivalent work experience.

PROCEDURES ANALYST

Primary responsibilities will include paper work simplification, designing and writing user documentation for computer systems, user training, and records retention studies. You must have strong communicative skills for this key position along with a broad knowledge of business manufacturing activities. One to three years business experience a real plus.

SENIOR PROGRAMMER

Primary function is to prepare from narrative or graphic specs provided by the analyst, difficult business application computer programs in COBOL. You will also document operations and may be responsible for some user training. One to three years experience in general business applications essential with exposure to mini-computers helpful.

We are offering excellent salaries and benefits along with superior opportunities for advancement and recognition. These positions are for our Carrollton, Georgia corporate location where you can enjoy the convenience of quick access to Atlanta (I-20) and the benefits of a family-oriented, small town environment should you decide to locate outside Atlanta.

Please send your resume or call **KAREN PAYNE at (404) 832-4306 COLLECT** to investigate these career opportunities.



**SOUTHWIRE
COMPANY**

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Carrollton, GA 30117

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COMPUTER PROFESSIONALS SPERRY UNIVAC In Salt Lake City

Has current openings for experienced professionals in support of our Development Center Computer Facility.

Consider the following challenges:

SYSTEMS PROGRAMMER: BSCS or equivalent with three-five years experience preferred in OS/1100 Operating Systems support. Will be required to support the operation of an 1100/80 computer.

DATA COMMUNICATIONS ANALYST: BSEE with two years related experience in data communications concepts and hardware.

We provide an excellent benefits package including comprehensive life, medical, maternity and dental, accident and sickness, retirement, stock purchase and educational reimbursement.

Call toll free 1-800-453-4534 or,
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**EMPLOYMENT DEPARTMENT
SPERRY UNIVAC**

Dept. TCF
322 North 2200 West
Salt Lake City, Utah 84116

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Relocate to the Twin Cities. One to 5 years of large IBM main-frame experience in retailing, banking, or manufacturing required. Salaries \$18,000 to \$32,000. All expenses paid. Send your resume with current salary and geographical preferences to National Headquarters.



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Visiting here? Call me to set up some interviews for you.

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(206) 424-9000

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Our Information Services department is housed in its own building with lounge facilities. On-line real time applications include Savings, Mortgage Loan and Consumer Loan. Other applications are Construction Loan, General Ledger, Payroll, Safe Deposit Box, Land Development and Statesman's Club. We have fourteen major projects scheduled in 1979 and several planned for 1980.

All our Systems and Programming personnel are involved in new project work. No one has only maintenance programming responsibilities. Every individual is scheduled for outside technical education each year.

Successful candidates should have at least two years bank application experience in a COBOL environment. Honeywell knowledge preferred but not necessary.

To take advantage of these ground floor opportunities forward your resume to the address below. It must include a brief description of your involvement in banking applications, salary history, salary expectations and a phone number.

Mr. John W. Benedict
Manager Systems & Programming
Albuquerque Federal Savings & Loan
P.O. Box 25000
Albuquerque, New Mexico 87125
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DATA PROCESSING CONTRACT SPECIALIST

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Our Operations Center is located in a well-established residential community just 10 minutes east of L.A. From this central Southern California location, you can enjoy beaches, mountain skiing and desert resort areas—all within a short drive.

The ideal candidate must have 1-2 years of Data Processing Contract Experience.

This individual will be responsible for assistance with the administration of contracts in terms of performance requirements and configuration of equipment.

Excellent written skills are needed for this position. Degree preferred but not mandatory.

At Security Pacific, you'll be working in state-of-the-art facilities in a clean, relaxed atmosphere. The salary is excellent and we offer a complete package of company benefits. To take advantage of this exciting career opportunity, send your resume including salary history to:

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611 No. Brand Blvd.
Glendale, Calif. 91203



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Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
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REGIONAL MANAGER

Computer Field Service

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Datapoint...New York City...the winning combination!

You will be responsible for the full management of the Customer Service field staff. In this position the responsibilities will include the supervision of District Managers and high level technical personnel in the New York-Metropolitan Area. Qualified candidates have worked in the data processing customer service field for a minimum of eight years. Accomplished experience in directing the activities of subordinate managers is required.

Join the "OUT-THINK" team for fast career growth!

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For prompt consideration, please send your resume including salary history to Mr. James Cooper, Datapoint Corporation, One Citicorp Center, 153 E. 53rd St., Third Floor, New York NY 10022.

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DATA PROCESSING

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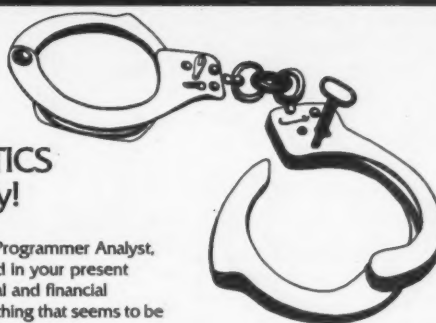
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DATE: October 11th and 12th

LOCATION: Chicago, Illinois

TIME: By Appointment

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foley's

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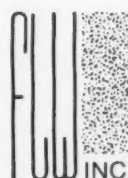
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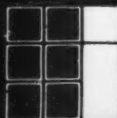
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Requires training and experience equivalent to graduation from a college or university with major work in computer science or a closely related field, plus three years experience in programming or systems analysis, including one year in a supervisory or lead capacity.

Skill in COBOL Programming language.

SYSTEMS DESIGNER

Salary: \$14,782 — \$21,817 Annually

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Requires training and experience equivalent to graduation from a college or university with major work in computer science or a closely related field, plus two years experience in programming or systems analysis.

Skill in COBOL programming language.

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Further information and application forms can be obtained from The Registrar, University of Tasmania, Hobart, 7000, Australia, or from the Association of Commonwealth Universities (Apts), 36 Gordon Square, London WC1H 0PF. Applications close on 19 October 1979.

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Applicants should have had 10 or more years of experience in the computing field, at least 5 of which will have been in management with progressively increasing responsibilities. Direct experience in the delivery of time-sharing and batch computer services is required, along with a thorough knowledge of computer hardware and software systems. Strong interpersonal and leadership skills are necessary and the ability to work effectively with faculty and administrative staff, both individually and in committee.

The deadline for the receipt of applications is October 15, 1979.

Applications for this position should be directed to:



Professor J.M. Marlborough
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with a GROWING company at its Corporate Offices on a wooded estate in Delaware County, PA. Minimum requirement of 2 years ANS COBOL. Knowledge of CICS and/or DL/I helpful.

We offer a variety of challenging work assignments, excellent benefits and professional growth.

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Dalmo Victor is the leader in the design and manufacture of State-of-the-Art Digital Radar Warning Systems. We offer outstanding salaries and benefits including COMPANY PAID MEDICAL (for you and your dependents); COMPANY PAID RETIREMENT PROGRAM; STOCK PURCHASE PLAN; EDUCATIONAL ASSISTANCE — and a great deal more!

Please send your resume to or PHONE COLLECT to Barry C. Kenny, Employment Manager, DALMO VICTOR, 1515 Industrial Way, Belmont, CA 94002. (415) 595-1414. An Affirmative Action Employer. U.S. Citizenship required.

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Bell Aerospace **TEXTRON**

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Technical Mgr./Prog-Analysts be part of a growth-minded management team being developed by an expanding reputable consulting firm opening a new office in our area. Ground floor opt. for large OS or Systems III experts, who are dedicated to "getting it right the first time!"



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Pete Cobb Associates

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PROGRAMMERS

Sr. Software Engineers

Microdata Corporation, a worldwide leader in the production of minicomputers and peripheral products, is seeking qualified Senior Software Engineers, due to the expansion of its current development programs. Immediate requirements exist in the areas of Systems, Firmware, QA, and diagnostic program development.

Diagnostic Software Engineers:

Selected candidates must have prior experience with specific skills in supporting and diagnosing Z80 and bit sliced microprocessor based controllers and CPTs. Firmware knowledge is a must.

Firmware Software Engineers:

The qualified individuals must have extensive firmware development experience with specific knowledge of Z80 and bit slice microprocessors.

Systems and QA Software Engineers:

Ideal candidates will have a general knowledge of compilers, operating systems, and system utilities, and with either high-level (PL/I or PASCAL) or assembly language implementation experience.

All positions require a BS in Computer Science or a BSEE and 4 years of related experience.

Microdata offers challenge and growth in an advanced state-of-the-art environment. Our salary and benefits program is more than competitive. For immediate consideration, please send resume and salary history to:

C.W. TAYLOR

Microdata
17481 Red Hill Avenue
Irvine, California 92714
(714) 540-1113

Microdata

Equal Opportunity Employer M/F

A SYSTEMS ANALYST position is available in the Developmental and Special Services division of the West Virginia Network. The minimum requirements are a BS degree or equivalent plus three years experience in programming or analysis. Experience with RSTS or RT-11 is desirable. Salary open. Apply by September 21 to Judy Martin, WVNetwork, 837 Chestnut Ridge Road, Morgantown, WV 26505.

An AA/EOE

BURROUGHS

PROGRAMMER/ANALYSTS

Minimum of 3 years experience in COBOL on small, medium or large systems.

Immediate openings. Excellent opportunities with a growing software development company in the San Diego, CA area. Competitive salary, based on experience.

Special consideration given for THRIFT System and/or S-1000 experience.

Send resume and salary history to:
EDP MANAGEMENT, INC.
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La Mesa, CA 92041

Network Development Software Professionals

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These positions will allow you to build on your prior operating systems and communications background as a member of an advanced software support group, introducing State-of-the-Art network and telecommunications software to the field. This will require you to make technical presentations as well as install and debug software at customer test sites. A moderate amount of domestic and foreign travel is necessary.

If you are a results-oriented individual, looking to revitalize your career with new challenges, you should be talking to us right now.

CALL COLLECT

(617) 667-3111, Ext. 2057

For immediate information, call Gloria Dumas Collect at (617) 667-3111, Ext. 2057, or send your resume including salary history to: Gloria Dumas, HONEYWELL S/MISD, MS-804, 300 Concord Road, Billerica, MA 01821.

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Honeywell

People.
Our Competitive
Edge

DATA PROCESSING CAREERS

COMTEN INC, a subsidiary of NCR, is a leading supplier of sophisticated data communications products and computer performance measurement products, has several openings for talented data processing professionals. COMTEN's rapid growth and an increasing demand for our performance measurement product, a DYNAPROBE, has enabled us to expand our staff:

SYSTEMS ANALYSTS

We are presently searching for additional qualified DYNAPROBE Systems Analysts to support the growing number of accounts in the Rockville, MD, Los Angeles and Philadelphia areas. The Systems Analysts chosen will be responsible for providing new accounts with implementation planning and initial installation of DYNAPROBE hardware and software. The Systems Analyst will also have an opportunity to assist sales personnel with technical presentations and proposals.

Qualified candidates should have knowledge of large scale systems (VS 1, MVS, 370/148 and above) and 2-3 years of systems programming experience. Knowledge of JCL and OS utilities is a definite plus.

MARKETING REPRESENTATIVES

We are looking for a highly motivated Marketing Representative to market COMTEN's performance measurement product, DYNAPROBE to new and existing accounts in the Los Angeles area. The candidate chosen will be responsible for all marketing activities as well as coordinating technical support. Successful candidates should possess a demonstrated record of 2-7 years progressive experience in data processing sales. Additional experience in the computer performance measurement field is a definite plus. The high degree of professionalism is rewarded by a generous compensation plan, complete benefits, expenses, and an opportunity for unlimited growth.

For immediate consideration, please call Chuck Wilson at 1-800-328-9122 TOLL FREE, or send a resume to:



Chuck Wilson

COMTEN

A subsidiary of NCR

1950 W. County Road B-2
St. Paul, Mn. 55113

Equal Opp'ty Emplr M/F

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ARRAY PROCESSING ENGINEERS:

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To set an interview while attending Wescon, call Shelley Smith at the Hyatt Regency, 415/389-3630, September 17-21, or call toll free 800/547-1445, ext 154 for an advanced appointment.

Project Engineers

One project requires experience with ECL design. Knowledge of AP/CPU architecture and hardware implementation (from a functional viewpoint or at block diagram level) is highly desirable. Must have some prior experience as a design team or project leader on a product development project.

The other project provides the opportunity to lead the development of high speed interface and peripheral products for a new family of array processors. Some experience with high speed logic design of peripherals for scientific and/or signal processing applications is required.

Senior Electronic Engineers

One opening is for a senior level engineer to lead digital design of high speed memory and arithmetic elements. Some experience with computer logic design is required and ECL experience desired.

The other position is for a senior engineer to lead digital design and development I/O and special purpose signal processing elements for use with array processors. Experience with TTL and bit-slice microprocessor design required.

Electronic Design Engineers

These positions are for intermediate level electronic engineers to participate in the design and development of various arithmetic, memory and interface elements for use with array processors. Experience with TTL, MSI/LSI logic, bit-slice microprocessor and/or semiconductor memory elements is required. A background in computer science is desirable.

Applications Software Engineers

Applicants must have a strong background in mathematics, numerical methods, FORTRAN and assembly language programming. Experience in one or more of the following areas: linear algebra, simulation, statistics, linear programming, signal processing and image processing, BS/MS in Engineering, Math or Computer Science or equivalent. Minimum of 2 years working experience in scientific applications programming.

Diagnostic Software Engineers

Challenging positions in diagnostic software development for our FPS product line. BSEE/BSCS or equivalent plus a proficiency in FORTRAN and one assembly language. Minimum of 2 years experience in diagnostic software development.

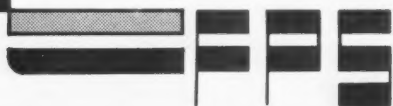
Field Support Engineers Hardware/Software

We have openings for hardware and software engineers to provide backup field service support at the "factory expert" level for FPS software. A well rounded conceptual understanding of computer operation, architecture and configuration. A working knowledge of FORTRAN and one assembly language. A degree in computer science is highly desirable plus system interfacing and hardware troubleshooting.

ALL POSITIONS OFFER TOP COMPENSATION PACKAGES.

If you cannot be in San Francisco, September 17-21, please send resume in confidence to Floating Point Systems, Inc., Attn: Shelley Smith, P.O. Box 23489-CW01, Portland, Oregon 97223. We are an equal opportunity employer m/f/h.

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You'll be responsible for overall performance and capacity management. We prefer someone already successful in managing a complex 303X and MVS environment. You must be capable of establishing and maintaining highly responsive timesharing, on-line DB/DC, as well as batch services.

Technical Services Manager

Be responsible for a wide variety of services in our large data center. You must have experience in applications programming and extensive knowledge of major computer languages including MVS, JCL, and TSO. This position acts as a liaison between users and the data center.

Data Communications Manager

In this position you'll be responsible for our nationwide data communications network. We expect you'll have experience with RJE, TSO and DB/DC systems. Exposure to SNA is a plus. You must also be highly proficient in the telecommunications control center activities and equipment as well as be able to deal with common carriers.

Basic qualifications for these positions include extensive practical experience in large scale IBM MVS computer systems with multiple 303X or 168/158 systems. You must also possess a degree related to one of these areas. An advanced degree is always a plus.

Send your resume in strictest confidence to:

CW Box 2059, 797 Washington St., Newton, MA. 02160

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EDP OPPORTUNITIES SYSTEMS ANALYST PROGRAMMERS

Requires 5 years' experience in EDP systems and programming with 2 years as an analyst in applications systems design (IBM 370 DOS; COBOL). On-line experience desirable.

PROGRAMMERS

Requires at least 2 years' COBOL and/or ALC experience on "IBM" 370 equipment. CICS command level language a plus.

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Shawmut Bank of Boston, N.A.

An Affirmative Action Employer

SYSTEMS PROGRAMMER

for R and D at the Cyclotron Project of Michigan State University. Facilities are undergoing a major expansion with a need for an experienced systems programmer. Applicants should send their resume to B. Waldman, Cyclotron Laboratory, Michigan State University, East Lansing, MI 48824.

Michigan State University
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Affirmative Action Employer

SKIERS

Live and play in beautiful Waterville Valley, NH while operating our IBM System/34. Seek individual with knowledge of SSP and MAPICS, or demonstrated ability to learn. Submit resume with salary requirements to:

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(603) 236-8822

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For DEC 11/70 RSTS/E BASIC-PLUS Mail Order Company Salary Commensurate w/experience

Send resume to:
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Charlotte, VT 05445

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Computer Systems Professionals

We are a leading computer systems development and management consulting organization specializing in the design and implementation of major on-line computer based business systems. Our existing operations in Boston, New York, San Francisco and Los Angeles have recently expanded creating the immediate need for qualified individuals in the following positions:

On-Line Systems/Applications Programmers
Project Managers
Telecommunications Specialists
Data Processing Consultants

We offer an opportunity to participate in intricate and challenging systems development projects on large scale computing systems and/or minicomputers. There is extensive client contact involved with the services we provide to the Banking and Insurance Industries, Government Agencies and the Industrial sector.

We have an excellent compensation package including company paid medical, dental and life insurance; four week vacation/sick leave; profit sharing; and a 100% tuition refund program.

Please send your resume with salary history in complete confidence to: Personnel Manager, **Data Architects, Inc.**, 460 Totten Pond Road, Waltham, Mass. 02154.

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dai / data architects, inc.

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for multi-year state-of-the-art program to produce a verified secure communications operating system. Technical experience in related area(s) required; Ph.D. or M.S. desirable. \$40-50K+.

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DIGITAL TECHNOLOGY INCORPORATED

ATTN: P. S. Healy
302 E. John, Champaign, IL 61820
or call collect 217-384-8500

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Central and South West Corporation

2700 One Main Place • Dallas, Texas 75250

DALLAS

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Will be responsible for establishment of a section for evaluation, recommendation, selection, and implementation of a corporate data base manager and data dictionary. Requires previous experience with Data Base Management Systems.

Mail resumes and salary requirements to Employee Relations Department, 2700 One Main Place, Dallas, Texas 75250. All replies treated in confidence.

EQUAL OPPORTUNITY EMPLOYER

TECHNICAL SUPPORT ANALYSTS

Perkin-Elmer's Computer Systems Division is a continually growing manufacturer of highly marketable, state-of-the-art minicomputer systems. Due to our growth and expansion, we have immediate openings for additional technical support people in our home office, located in Oceanport, New Jersey, to support our ever-expanding field sales and analyst staff.

NATIONAL SOFTWARE SUPPORT

Responsibilities will include technical support of field Systems Analysts by problem analysis and definition; generation of resolutions and technical bulletins; participation in Software Services' product planning and evaluation; provide feedback and review to Marketing and Software Development; develop programs, tools, or procedures to automate or improve Analyst efficiency and customer response.

SYSTEMS EVALUATION

Responsibilities will include evaluation, implementation, and analysis of performance measurement software; demonstrations; design of major system configurations; technical responsibility for sales proposals to potential customers; and development in automation of sales supportive activities.

Positions require individuals with a degree and 2 to 5 years computer systems experience. Additional experience considered in lieu of degree. FORTRAN, an assembler, OS, and data communications experience desirable.

Perkin-Elmer offers excellent salaries, comprehensive benefits and exceptional opportunities to grow in a highly professional environment. We are located just 40 miles south of New York City on the northern Jersey Shore known for its beautiful residential area, beaches, and recreational opportunities. For immediate and confidential consideration, call collect or send resume including salary requirements to: Bill Beattie, (201) 747-7300, Perkin-Elmer, Computer Systems Division, 106 Apple Street, Tinton Falls, New Jersey 07724.

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- *Programmer Analysts

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We are a well-established, growth oriented, multi-line insurance company with corporate headquarters on the beautiful San Francisco Peninsula and 18 branch offices throughout the Western United States.

Our modern installation has a 370/148, COBOL, VM, OS-VS 1, CICS-VS, SDLC environment. If you are ready for a change, and have the skills to meet the challenge, consider California Casualty — an ideal sized company that is large enough to provide opportunities for growth, yet small enough to recognize your contribution.

For immediate confidential consideration, forward your resume to:



California Casualty Management Co.

P.O. Box M
San Mateo, CA 94402
Attn: C.G. Abrams

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ASSISTANT DIRECTOR

The Educational Computing Network is a service program of the Illinois Educational Consortium providing academic computing services to universities in Illinois. ECN operates a Cyber 170-730 computing facility under the NOS Operating System and supports a statewide telecommunication network. A major constituency served by ECN is the Mid-Illinois Computer Cooperative, whose 9 member universities currently comprise the major user community of the ECN.

Requirements for the Assistant Director

The Assistant Director of ECN will be directly responsible to Executive Director of ECN for the daily operations, user interface and support services of ECN. This position will have line responsibility for the systems programming, operations and user services functions. This individual will also function as support staff in preparing utilization reports, background studies, service analyses and other duties as required by the Executive Director.

Qualifications of the Assistant Director of ECN

The Assistant Director will be primarily a management position and will require demonstrated ability in motivating, supervising and communicating. The Assistant Director will be required to prepare and present both written and oral plans, proposals and reports related to ECN service activities. The responsibilities require knowledge of hardware, programming, systems analysis, operating systems and telecommunications.

Candidates for this position should have direct experience with computing activities in higher education. Candidates should possess a strong technical background in computing and have significant experience in computer center management. Candidates must possess leadership, self-motivation and high personal and professional standards. Credentials and references should testify to above average success in both technical and managerial endeavors.

Salary is commensurate with experience and ability. An excellent fringe benefit package is offered. Resume with salary history and requirements should be forwarded to:

W. D. Parrill
Executive Director
Educational Computing Network
Cottonwood Office Center
Cottonwood Road
Edwardsville, Illinois 62025

CONSULTANT

Excellent upper level position available with this wholly owned subsidiary of well respected CPA Firm. Strong systems analysis (commercial applications) and heavy user interface with some programming experience in background. Responsibilities are technical consulting to clients in publishing industry. Highly visible with good growth.

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1 Lk. Bellevue Dr.,
Bellevue 98005
206-453-0444

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DEAN OF BUSINESS SERVICES****at
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Prescott, Arizona**

Yavapai College is a fully-accredited, comprehensive community college serving some 5000 students in Northern Arizona. The main campus is located at Prescott, 100 miles north of Phoenix, adjoining the Prescott National Forest.

ESSENTIAL QUALIFICATIONS:

Bachelor's Degree in Business and/or Personnel Administration or related areas; at least two years of related experience. Must be proficient in planning, budget development, budget control, and salary administration. Must have experience in supervision of a fiscal operation.

DESIRABLE QUALIFICATIONS:

Master's or Doctor's Degree. Knowledge of MBO, ZBB, and data processing. Experience in Community College administration. Certified as a CPA.

SALARY:

\$28,000 — \$33,000 depending on qualifications.

RESPONSIBILITIES:

Fiscal management, planning, budget development, salary administration, purchasing, auxiliary enterprises, data processing, classified and support personnel, inventory control and maintenance of physical plant.

STARTING DATE:

November 1, 1979, or as soon as possible

APPLICATIONS:

Letter of application, resume, three letters of professional recommendation, and names and telephone numbers of five professional references should be addressed to:

**Dr. David Hochstetler, Chairman
Dean of Business Services Screening Committee
Yavapai College
1100 East Sheldon Street, Prescott, Arizona 86301
(602) 445-7300**

CLOSING DATE:

September 30, 1979

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**Assistant Systems And
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Must have thorough knowledge of modern techniques of systems analysis and design. Must be able to analyze operations and organize their component parts into a logical system. Two to five years experience in systems analysis and programming, some of which shall have been in a supervisory capacity, and graduation from an accredited college or university with major work in computer science, supplemented by graduate course work in business or public administration required. Applications accepted through September 30, 1979. Apply to the

City of Virginia Beach
Department of Personnel
Municipal Center
Virginia Beach, VA 23456

E.O.E. M/F/H

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Data Processing

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Senior and intermediate level programmer analysts to develop a number of standardized business applications for installation across all locations.

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Senior analyst to develop data communications oriented applications supporting all locations.

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Senior technical programmer to maintain operating system software across all locations, and trouble-shoot hardware/software problems.

These positions include excellent salaries and an attractive benefits package. Please send your resume to:

Personnel Manager

FRUEHAUF CORPORATION
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**DATA PROCESSING
OPPORTUNITIES**

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In These Career Growth Positions

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INTERNAL SYSTEMS CONSULTANT

This opportunity is for an individual with Data Base experience, as well as extensive experience in business and technical design of manufacturing systems and the related business responsibilities. A degree is preferred. Reporting directly to the Corporate Manager of Data Processing, you'll be working with all types of business systems, but your major assignments will involve MRP, Shop Scheduling, Purchasing, Inventory Control, etc.

PROGRAMMER/ANALYST

This position requires a hard-working person with a minimum of 3 years solid COBOL experience. Preferred qualifications include thorough knowledge of OS/JCL and IMS Data Base experience. Experience with manufacturing applications helpful.

You'll find the professional stimulation you need to keep your career thriving — and that brings a special kind of personal satisfaction. We offer a salary commensurate with your experience, along with a range of fringe benefits.

FOR IMMEDIATE ATTENTION,
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Bonnie Filoso
Philips Ind. Inc.
4801 Springfield St.
Dayton, OH 45401

**PHILIPS
INDUSTRIES INC.**

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DATA PROCESSING

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- Sr. Systems Analyst
- Systems Analyst
- Programmer/Analyst
- Programmer
- Systems Programmer
- Operations Analyst

Candidates must possess a minimum of two years experience in the related position including COBOL or PL/I for the Systems and Programming openings. If you are looking for a challenge, and are willing to learn, you may be qualified to participate in the development of one of a variety of "grassroot" projects including an on-line, data base oriented interstate transportation system. We offer a competitive wage and liberal fringe benefit package. Please send resume, including wage history, in confidence to:

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Penn Yan, New York 14527

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Storage Technology Corporation is only ten years old and already the world's largest manufacturer of high density tape storage products and a major manufacturer of disk subsystems.

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If you are a self-motivator looking for a new challenge STC offers the opportunity for contribution and individual development not often found with a major corporation. Systems Engineers with STC consult and provide technical support to field sales and marketing. You set your own schedules and prepare your own presentations. And we may have a good spot for you right where you are now. Requirements include:

- A college degree (or equivalent experience)
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CORPORATION**

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Louisville, Colorado 80027

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SRZ Software Services, Inc.
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(805) 497-6975

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Design, develop and implement business applications which will enhance our editorial systems in the publishing industry. Candidates should have extensive experience on DEC's 11/34 or VAX 11/780 experience using standard business applications or data base management systems (ADABAS TOTAL, SYSTEM 1022, Fortran, COBOL, etc.).

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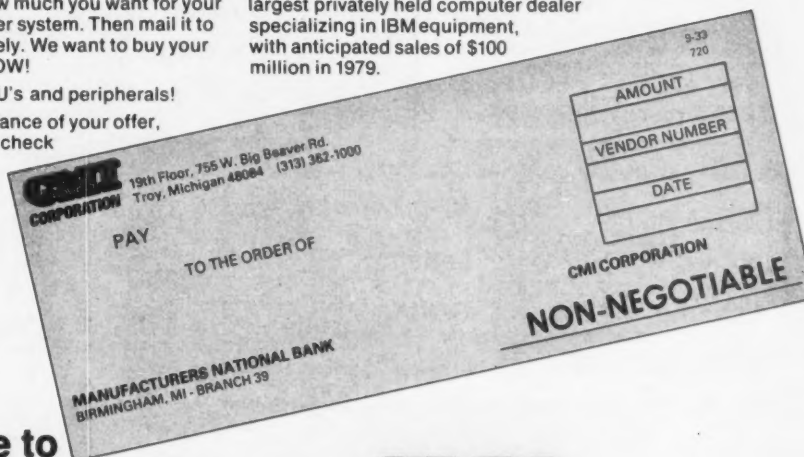
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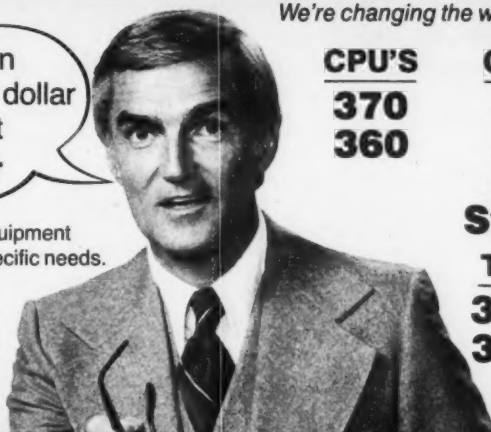
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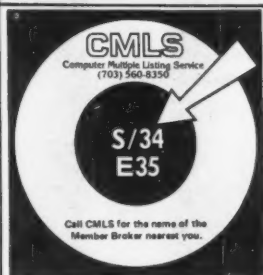
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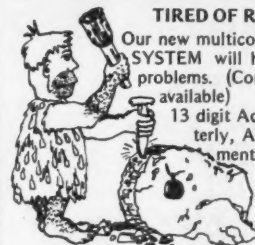
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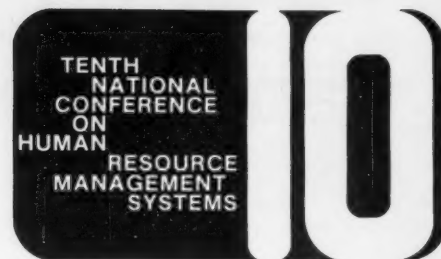
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